

DIV. OF FISHES

Nov 1 1958

MUSEUMS

# COMMERCIAL FISHERIES REVIEW



Vol. 20, No. 9

SEPTEMBER 1958

FISH and WILDLIFE SERVICE  
United States Department of the Interior  
Washington, D.C.



# COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries  
prepared in the BUREAU OF COMMERCIAL FISHERIES.

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Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Chief, Branch of Market News, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington 25, D. C.

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The printing of this publication has been approved by the Director of the Bureau of the Budget,  
May 21, 1957. 5/31/60

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September 1958

Washington 25, D.C.

Vol. 20, No. 9

## A PRACTICAL DEPTH TELEMETER FOR MIDWATER TRAWLS

By Richard L. McNeely\*

### SUMMARY

A direct-reading electrical depth telemeter for midwater trawls has been developed and used successfully in the northeastern Pacific. The system utilizes an electrical trawl cable to transmit continuous depth information from a pressure-sensing unit on the gear to a pilothouse meter which shows trawl depth in feet and fathoms. Slip rings and brushes on the trawl winch complete the electrical circuit, which is powered by a 45-volt battery located in the control box in the radio-chart room. Maximum depth range of the system with the present potentiometer is 225 fathoms, but this can be increased or decreased as may be required. Advantages of the system are its simplicity and practicability, requiring no extra handling on deck and no specially-trained operator. It has been tested and used successfully during the spring and summer of 1957 aboard the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb based at Seattle.

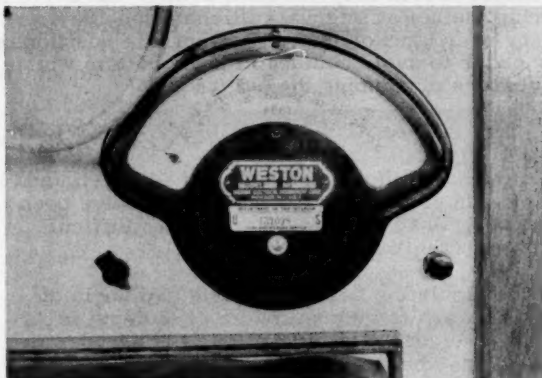


Fig. 1 - Pilothouse depth meter for the electrical telemeter, calibrated to show depth of the trawl in feet and fathoms.

### INTRODUCTION

A depth telemetering system, utilizing a low-voltage electrified trawl cable for determining the depth of midwater trawls, was installed and used successfully aboard the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb in the northeastern Pacific during the spring and summer of 1957.

Accurate knowledge of the depth of the net is essential to successful midwater trawling. No matter how efficient the gear might be, unless it is placed at the proper depth indicated by fish signs on the echo-sounder or by other means, the school of fish will be missed entirely or only a small catch will be made. This problem has been apparent during the several years of intermittent midwater trawling research by the Bureau's Branch of Exploratory Fishing and Gear Research. A variety of methods have been used in various parts of the world to determine the depth of midwater trawls, but there has always been the need for a more practical instrument which is accurate, simple to use, and economically within reason for commercial

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fishermen. The electrical depth telemeter, which was designed, constructed, and installed at Seattle by Bureau personnel, appears to meet this need.

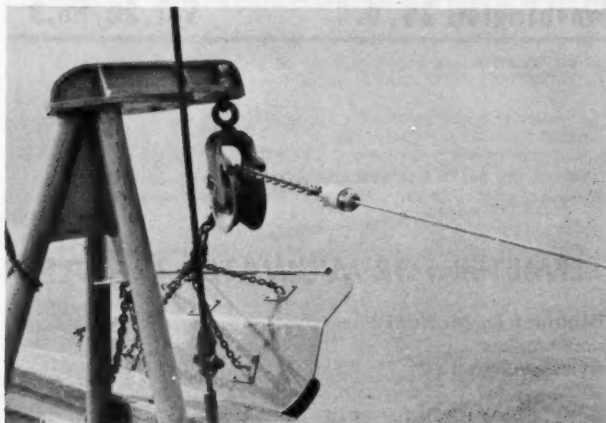


Fig. 2 - Pressure-sensing unit attached to the end of the electrical trawl cable just in front of one of the trawl doors.

easily if the net is a few fathoms too high or too low. During a single tow separate schools of fish may be found at different depth levels, necessitating raising or lowering the net at intervals (Richardson 1957). Also, when attempting to catch fish very near hard or uneven bottom, the position of the gear must be accurately known in order to avoid contact with the bottom which could snag the trawl doors and depressors or damage the net itself.

#### EARLY METHODS OF TRAWL-DEPTH DETERMINATION

Many methods and devices have been used in attempts to accurately determine the depth of midwater trawls. None have been entirely satisfactory due to inaccuracy, cost, depth limitation, operating difficulties, or fragility.

Calculation based on length and angle of towing warp to determine the gear depth is one of the oldest methods. Also, a second vessel has been used to sound the net as it is being towed at various depths. Bathythermographs have been attached to the trawl to record the depth range and to check other methods of calculation. Tables and graphs have then been prepared to show the probable trawl depth for each wire angle-length combination (Barracrough and Johnson 1956). Shortcomings in these methods arise from the effects of currents, wind, and tide on the wire angle at any given throttle setting and length of towing warp, and from the unknown changes in the underwater wire angle with varying sea conditions.

Several accurate depth telemetering systems have been used with a fair degree of success. An electronic-acoustic telemeter was built and tested by the Woods Hole (Mass.) Oceanographic Institute (Dow

Although midwater trawling by commercial fishing vessels thus far has been limited primarily to herring in northern Europe and British Columbia, there is evidence that at times other species of fish may be available to midwater gear, thus opening up vast new fishing areas of the ocean. Echo-sounders and sonar-type instruments have shown that schools of fish may be found at any depth between the surface and the bottom. A method to permit accurate positioning of the net is necessary because some schools of fish occupy a relatively thin vertical layer of water and can be missed

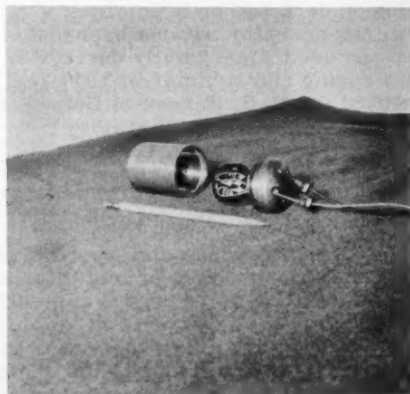


Fig. 3 - Bronze pressure vessel with cap removed to show pressure potentiometer, feed-throughs, and "O" ring seal.

1954). An improved version of that instrument was constructed by the University of Miami Marine Laboratory under contract with the U. S. Fish and Wildlife Service (Stephens and Shea 1956). This instrument was used in midwater trawl research on several of the Bureau's vessels and on the John N. Cobb until the present electrical

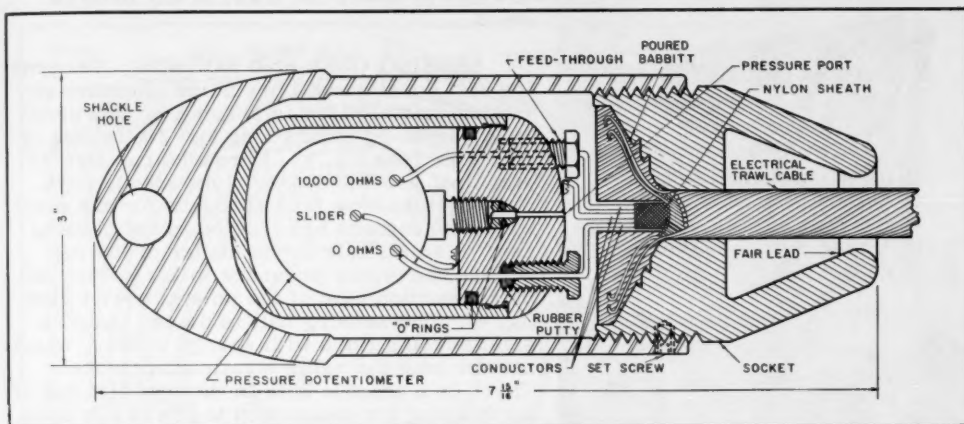


Fig. 4 - Sensing unit, housing, and cable termination of the electrical depth telemeter.

telemeter was installed. Although it was satisfactory in determining trawl depth during approximately 200 tows ranging in depth from surface to 225 fathoms, disadvantages of cost, maintenance, size, weight, and need for a specially-trained operator make any commercial application doubtful.

A unique and accurate air-pressure equalization system for trawl depth determination has been developed and used recently during midwater explorations for herring in the Gulf of Maine (Smith 1957). Activities were confined to relatively shallow water, with the equipment having a maximum operating depth of about 100 fathoms.

#### DESCRIPTION OF THE ELECTRICAL DEPTH TELEMETER

The system transmits continual depth information from the midwater trawl gear to the pilothouse of the vessel. A small pressure-sensing unit (see fig. 2) located on the end of the trawl cable at one trawl door actuates a pilothouse-mounted milliammeter which is calibrated to read depth in both feet and fathoms (see fig. 1). Electrical continuity at the trawl winch is through a slip-ring and brush assembly mounted on the outside of the winch drum. Steel trawl cable having insulated conductors for a core provides a full electrical circuit for the system.

The dial of the depth meter in the pilothouse is calibrated in one-fathom and 5-foot intervals from 0-50 fathoms and 0-300 feet. An off-on range selector switch

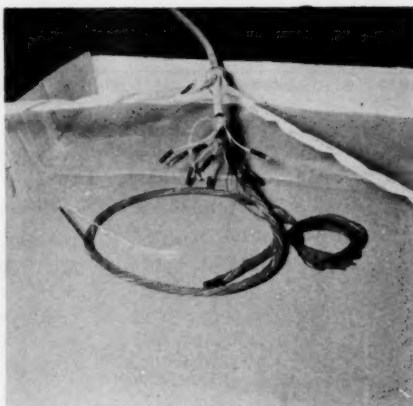


Fig. 5 - Electrical trawl cable prepared for splicing, showing core, fillers, conductors, and the two layers of steel strands.

permits selection of successive 50-fathom segments from 0-225 fathoms (which is the maximum depth of the particular pressure potentiometer used). The captain refers to the meter and adjusts the length of towing cable or speed of the vessel in order to raise or lower the trawl to any desired depth.

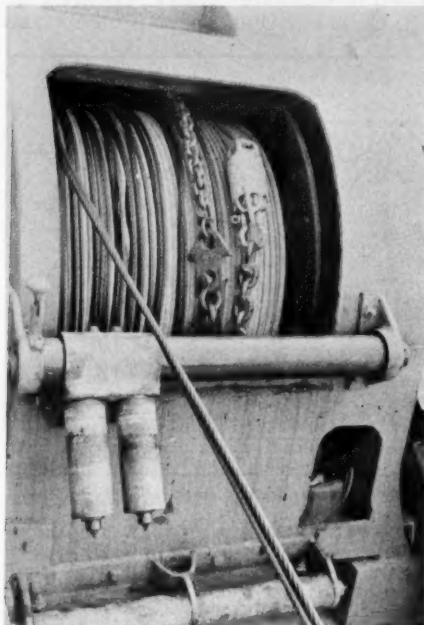


Fig. 6 - Electrical trawl cable, midwater trawl bridle, and the telemeter sensing unit on winch of the John N. Cobb.

ometer slider accounting for the major part.

Other pressure potentiometers having greater or lesser pressure-resistance values are available commercially. The 225-fathom depth range was selected as the most practical for present use.

**CABLE AND TERMINATION:** The electrical trawl cable is 0.528 inches outside diameter, double-armored steel, consisting of an electrical conductor core and two layers of 24-strand opposed helical-wound high tensile galvanized steel (see fig. 5). The six rubber-covered conductors are each made up of seven strands of 0.012-inch diameter copper wire and are wrapped around a solid-rubber center filler. Only three conductors are used, the remaining three being spares. The wire size of each conductor is equal to No. 21 a.w.g., and resistance is 11.1 ohms per 1,000 feet. Nylon fillers and sheath encase the conductors, making a round electrical core approximately  $\frac{5}{16}$ -inches in diameter. Breaking strength of the cable, according to the manufacturer, is 18,000 pounds.

**SENSING UNIT AND HOUSING:** The sensing unit consists of a precision pressure potentiometer encased in a Tobin bronze pressure vessel  $3\frac{3}{8}$  inches long and  $2\frac{1}{16}$  inches in diameter (see fig. 3). Threaded cap and "O" ring seal provide a watertight access port. Stuffing-tube type feed-throughs for the electrical conductors are located in the housing cap. A small hole in the center of the cap admits sea-water pressure to the castor oil-filled bourdon tube of the potentiometer (see fig. 4). The sensing unit is placed inside a steel housing lined with sponge rubber, which screws onto the cable termination socket. There is a shackle hole in the opposite end of the housing for connection to the bridle lines or chain of the midwater trawl gear. The housing is  $7\frac{1}{16}$  inches long by 3 inches in diameter, over-all size.

The sensing unit potentiometer has a pressure range of 0-600 p.s.i., with an electrical resistance differential of 10,000 ohms. Thus, the depth range of the instrument is 0-225 fathoms. Linearity deviation is less than one percent, with friction of the potentiometer slider accounting for the major part.



Fig. 7 - Access port of the trawl winch showing location of the slip rings between the winch shaft bearing cap and the drum flanges.



Type of termination developed for the cable used on the John N. Cobb is an extreme wide-angle and shallow poured-babbitt socket (see fig. 4). Glass tape is wrapped around the conductors for protection during babbitting. This termination relieves external pressure on the conductors, as opposed to the common deep narrow-

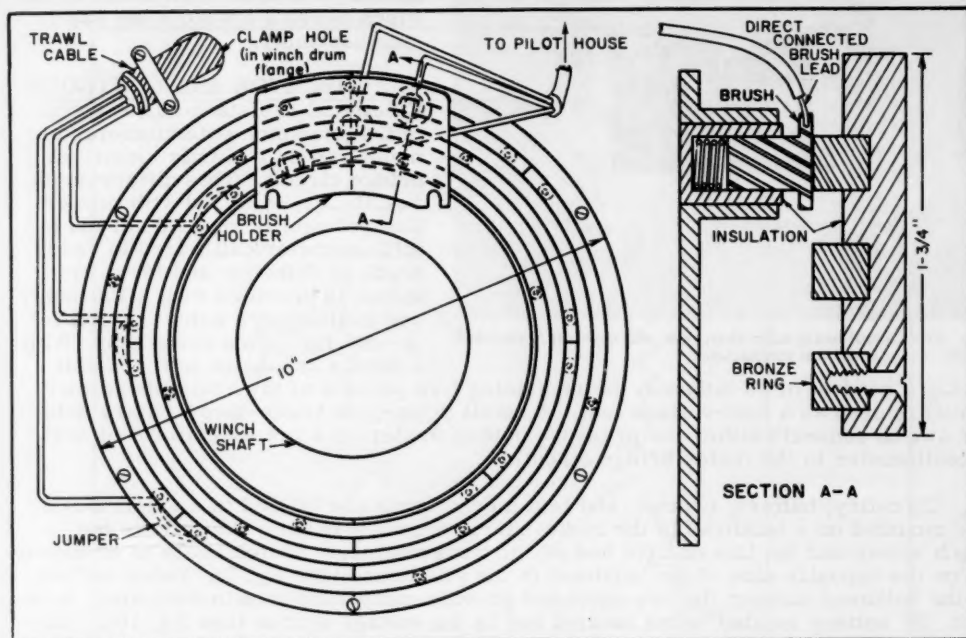


Fig. 8 - Slip-ring and brush assembly for the electrical depth telemeter.

angle socket which tends to squeeze and cause shorting. The wide-angle socket also requires a minimum of length making it possible to contain the cable termination and pressure-vessel sensing unit in a single small housing which will pass through the trawling blocks and wind up on the winch (see fig. 6).

#### SLIP RINGS AND BRUSHES:

A set of three bronze face-type slip rings are groove mounted in plexiglass and installed on the outside of the drum near the shaft (see figs. 7 and 8). In order to utilize a minimum of space in the winch-drum housing area and avoid disassembly of the winch, the rings and mountings are split halves with the ring joints rotated 45° so that on assembly around the winch shaft they become a solid unit. Jumper wires on the back of the mounting provide electrical continuity across the ring joints. Spring-mounted, solid brass, button-type brushes with direct connected pilothouse leads are bolt-

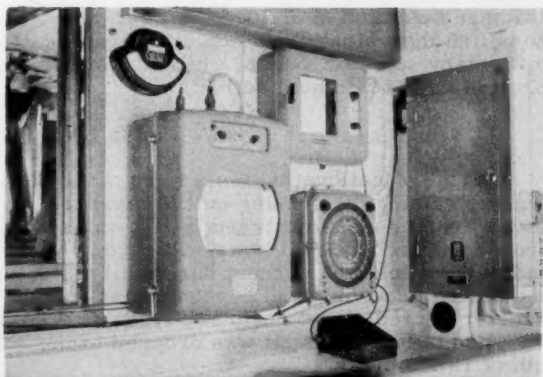


Fig. 9 - Arrangement of instruments in the pilothouse of the John N. Cobb showing trawl depth meter in lower right corner.



ed to the winch shaft bearing cap. The winch end of the electrical trawl cable is fed through the clamp hole of the drum, and the conductors are connected to the slip

ring terminals to complete the circuit from potentiometer to pilothouse. A weathertight cover on the winch housing protects the slip-ring assembly.

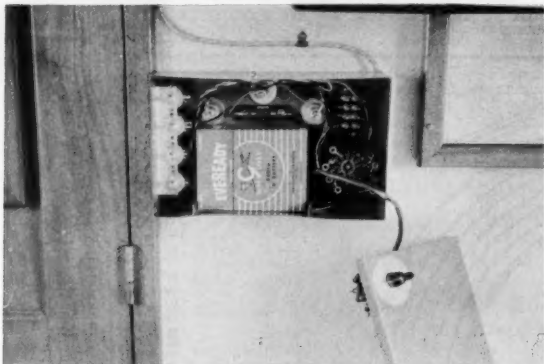


Fig. 10 - Control box in radio-chart room with cover off to show battery, controls and test mechanisms.

giving a readout of 50 fathoms, the remaining five percent of the available pointer travel is used as a line-voltage test. A small three-pole triple-throw rotary selector switch connects either the pressure potentiometer or a preset calibrating test potentiometer to the meter bridge circuit.

Circuitry, battery, control, and test mechanisms are housed in a small metal box mounted on a bulkhead in the radio-chart room in a manner that allows the depth meter and the line control and off-on range selector switch knobs to be mounted on the opposite side of the bulkhead in the pilothouse (see fig. 9). Holes drilled in the bulkhead connect the two units and provide compactness of installation. A 45-volt "B" battery located in the control box is the voltage source (see fig. 10). Battery drain is 4.2 milliamperes, which should require a minimum of battery replacements. Actual line voltage is 28 volts; thus the 32-volt battery system carried on most fishing vessels could be used as a power source provided that voltage changes were checked and compensated for during telemetering operations. The low voltage used presents no hazards to personnel.

Range selection is divided into four-and-one-half 50-fathom increments. To accomplish this, eight precision 2,222-ohm resistors are mounted on a two-pole six-throw rotary selector switch, which is used to return the meter pointer to zero at the end of each 50-fathom deflection.

#### SEA TESTS AND TRIALS

A series of calibration tests were made aboard the John N. Cobb at sea by lowering and raising the sensing unit to measured depths. A ten-minute warm-up period with the sensing unit immersed in sea water, to neutralize capacitance and temperature effect, preceded all tests. Accuracy of the electrical depth telemeter was found to be at least 98 percent during all tests. A slight lag of one-half fathom was noted during ascending and descending at normal winch speed. Depth readings of the telemeter agreed closely with two types of echo depth sounders during comparison tests when the sensing unit was dropped to the bottom at intervals out to a maximum depth of 187 fathoms.

Chief concern during construction, testing, and early use of the new telemetering system was the unknown ability of the electrical trawl cable to withstand the punishment of regular fishing operations. Full-power test runs towing a 70-foot-square-opening nylon midwater herring trawl were executed with normal turns and

excess cable played from the opposite drum to put the greater load on the electrical trawl cable. A cable dynamometer showed a maximum cable strain of 4,700 pounds at full throttle with 360 fathoms of cable out and the net at 83 fathoms. To date the cable has been used during some 50 tows with no sign of damage or fatigue noted. There has been no apparent damage to the electrical conductors.

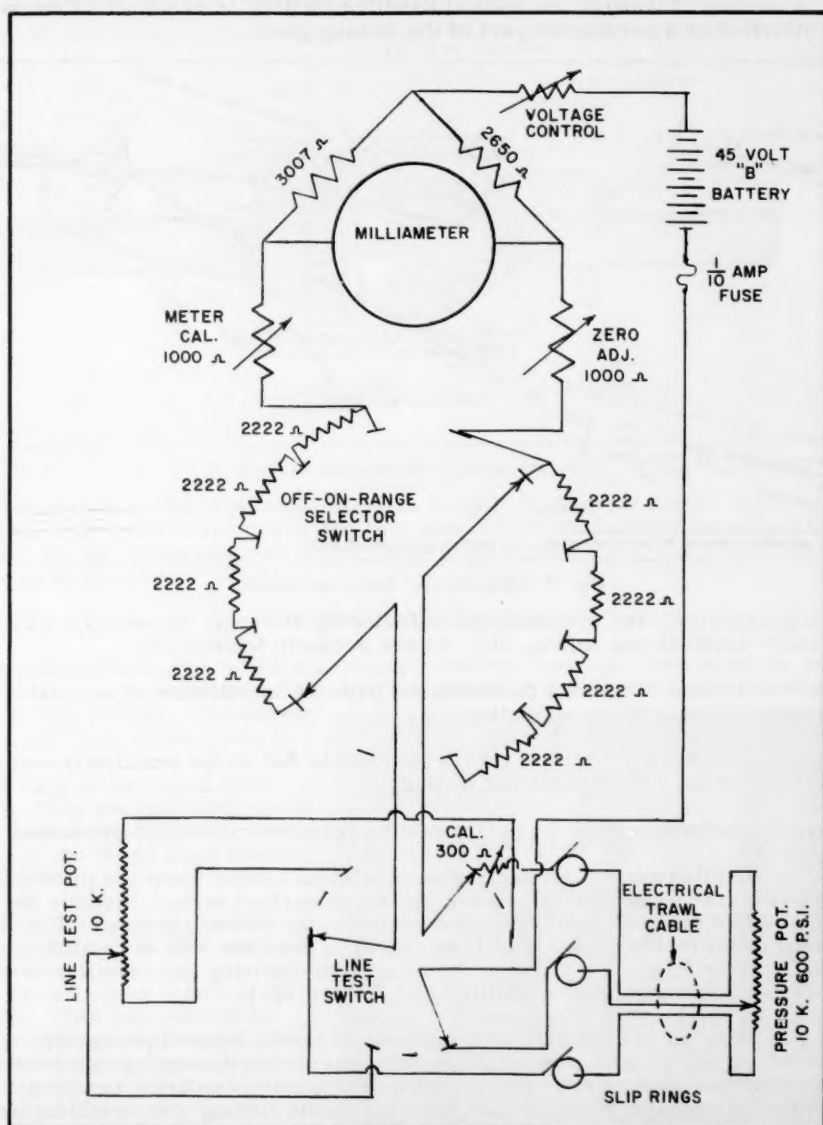


Fig. 11 - Schematic layout of electrical depth telemetering system installed on M/V John N. Cobb.

## ADVANTAGES AND DISADVANTAGES

The greatest advantage of the electrical depth telemetering system is its simplicity and practicability. Since it is a direct-reading instrument with a simple off-on range selector switch and line control rheostat to set, no specially-trained operator is needed. Likewise, no special handling on deck is required as the sensing unit is attached as a permanent part of the fishing gear.

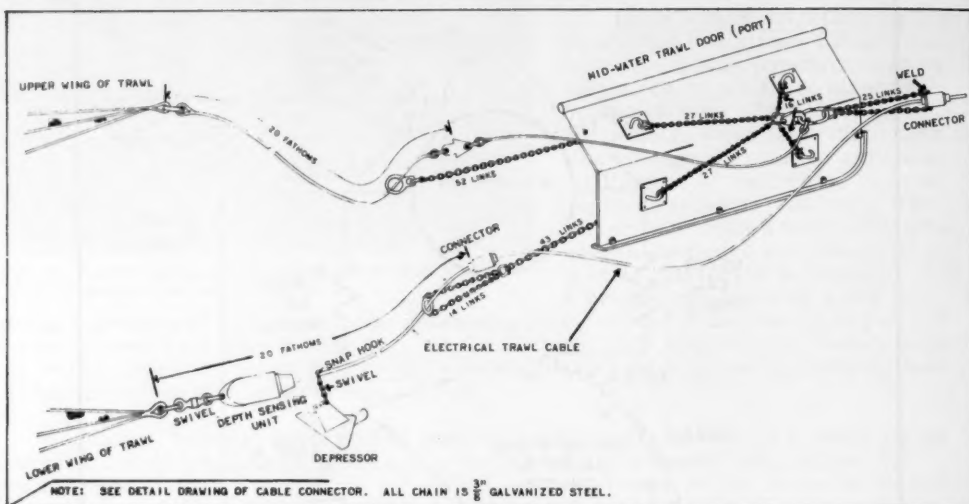


Fig. 12 - Midwater trawl door-to-net assembly.

Being electrical, the system is not affected by distance, directivity, water currents, wake, ambient sea noises, etc., as are acoustic telemeters.

The 225-fathom range can be increased with the installation of a suitable pressure potentiometer, and recalibration.

Use of the system on bottom trawls is feasible due to the small size and rugged construction of the sensing unit and housing.

Routine maintenance can be performed by relatively unskilled personnel.

The accomplishment of connecting an electrical circuit from the pilothouse of a fishing vessel to a trawl deep beneath the ocean surface makes possible the transmission of other types of desirable information to the vessel operator. Constant monitoring of water temperature at trawl depth is possible with the addition of a small thermistor inside the pressure housing of the sensing unit, similar to the S-T-D used by oceanographers (Collias and Barnes 1951).

Ink pen recordings of depth and temperature can be made if permanent records are desired. Also, graphic presentation of telemeter depth readings onto the echosounder recording paper used during fishing operations is entirely practical. Even some form of automatic or adjustable controls on the fishing gear could be installed if found to be desirable and practical in the future (Fryklund 1956).

Apparent possible disadvantages of the electrical depth telemeter are few and may prove to be of minor importance with continued use of the system.

Splicing the electrical trawl cable is more difficult and time-consuming than splicing standard cable used on fishing vessels. A 50-foot long-splice is required, which was found to be not unduly difficult after some experience. The 3,000-foot cable in use on the John N. Cobb is made up of two sections which were spliced together by two staff members in approximately two working days.

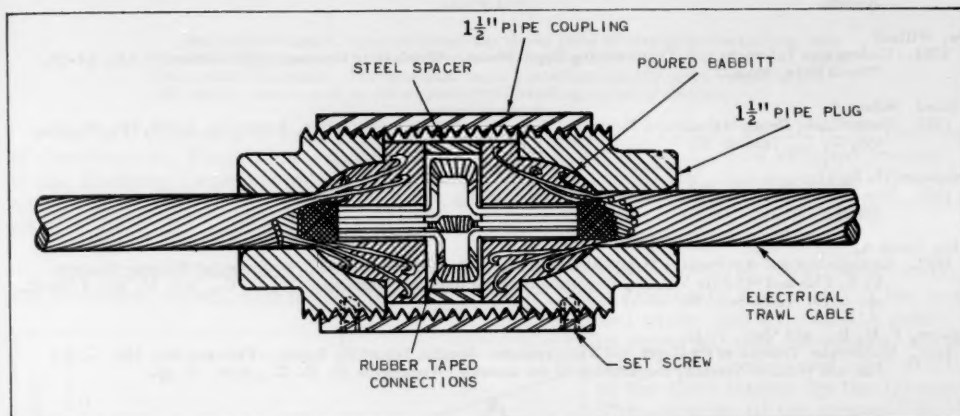


Fig. 13 - Connector for electrical trawl cable.

Present cost of the electrical cable is roughly 60 percent higher than the cost of regular plow steel trawl cable, but this cost differential cannot be properly evaluated until the life expectancy of a new cable is determined through actual service over an extended period of time.

#### LATEST REFINEMENTS

Certain refinements to the electrical telemeter hook-up were made on subsequent field trials to provide more accurate lead-line depth when midwater trawling very near the bottom. The depth-sensing unit was moved from in front of the trawl door to the lower port wing of the trawl (see fig. 12). This necessitated use of two electrical trawl cable connectors at the trawl door (see fig. 13).

Some breaking of the electrical conductors in the core of the trawl cable was experienced during later bottom trawling operations. This was caused by the stresses created as the electrical trawl cable passed around the standard size 9-inch diameter towing blocks (see fig. 2).

The use of specially-designed and fabricated 20-inch diameter aluminum trawl blocks has apparently remedied this condition (see fig. 14).

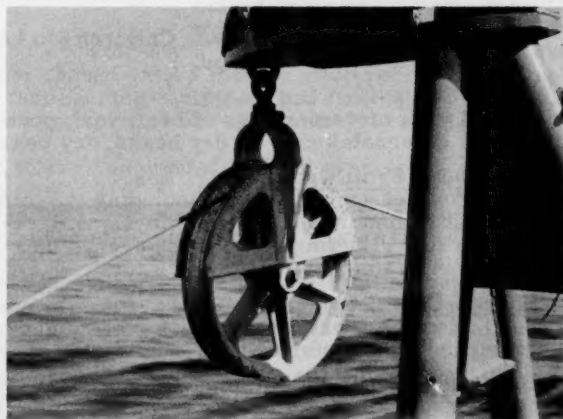


Fig. 14 - Large Block--20-inch diameter, aluminum--used with electrical trawl cable.

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## FOOD FOR FITNESS - A DAILY FOOD GUIDE

Food for Fitness - A Daily Food Guide, Leaflet No. 424, compiled by the Institute of Home Economics, U. S. Department of Agriculture, which supercedes The Basic Seven is now available to the public. In this guide, the main part of the daily diet is selected from these four broad groups:

Milk Group:

Some milk for everyone. Children 3 to 4 cups; teen-agers 4 or more cups; adults 2 or more cups.

Meat Group:

Two or more servings of beef, veal, pork, lamb, poultry, fish, or eggs. Alternates may be dry beans, dry peas, and nuts.

Vegetable Fruit Group:

Four or more serving including: A citrus fruit or other fruit or vegetable important for vitamin C. A dark-green or deep-yellow vegetable for Vitamin A--at least every other day. Other vegetables and fruits including potatoes.

Bread-Cereal Group:

Four or more servings of bread and cereals that are whole grain, enriched, and restored

Choose at least the minimum number of servings from each of the four food groups. Make choices within each group according to suggestions given in the leaflet. Choose additional foods to round out your meals both from foods in the four groups and from foods not listed in these groups. Try to have some meat, poultry, fish, eggs, or milk at each meal.

Leaflet No. 424 is sold for 5 cents a copy by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.



## COLOR AND QUALITY OF CANNED GULF OF MEXICO YELLOWFIN TUNA AS RELATED TO WEIGHT OF FISH

By Arnold W. Tubman\* and Lynne G. McKee\*\*

### ABSTRACT

Both color (Munsell value attribute) and flavor score of canned yellowfin tuna from the Gulf of Mexico became less desirable with increasing weight of the fish from which the product was made. The dominant factor controlling quality is the weight of the fish and not one or more of the experimental handling variables studied.

On two successive years, yellowfin tuna caught and landed by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel *Oregon* were shipped frozen to the Fishery Technological Laboratory, College Park, Md., for canning. The first shipment consisted of 31 yellowfin landed in July 1956; the second shipment consisted of 8 yellowfin landed in August 1957.

The Gulf of Mexico tuna industry was a new industry in 1956. Yellowfin tuna, the principal catch, had not, prior to that year, been critically examined in the canned state and the results publicly reported. Accordingly, advantage was taken of the availability of the tuna landed by the *Oregon*. The purpose of the present work was to can the yellowfin tuna in a commercial manner, note the color and general acceptability of the pack, and note also whether these factors were related to any observable characteristics of the fish.

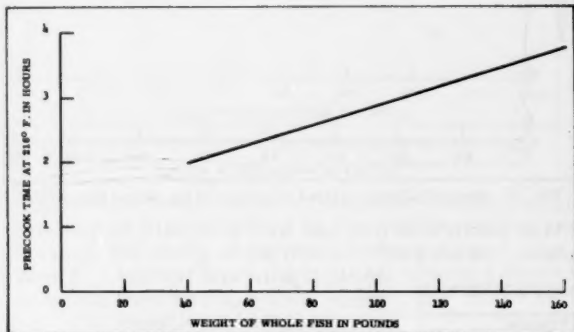


Fig. 1 - Relationship of precook time at 216° F. to the weight of the whole frozen fish.

freezer paper, overwrapped in burlap, and stored at 3° F. in commercial cold storage. The first shipment of 31 fish was not canned until 8 months after receipt; the long delay was necessitated by the fact that canning equipment had first to be installed at the laboratory. The second shipment was canned within a month of receipt.

Fish were removed from cold storage as needed, thawed overnight in fresh water, and precooked the following day at 216° F. Owing to the comparatively large size of the tuna, the fish were sawed into right and left halves before being precooked. The halves were placed exposed meat side down on a wire tray covered with punctured kraft paper. The relationship of the precook time used to the weight of the whole frozen fish is presented in figure 1. The fish, after being precooked, were removed from the retort on the wire trays and cooled at room temperature through the night. The following morning--the second day after the tuna had been placed in the thaw tank--the fish were skinned and cut into loins, and the dark meat was removed. The afternoon of that second day the loins were cut and packed. From each fish, 36 cans of solid pack and 10 cans of flake meat were prepared in 307 x 113 "C" enamel cans.

To each can of packed tuna were added 1¼ ounces of corn oil and one heaping ¼ teaspoon (an average of 2.3 grams) of salt. While the tuna meat was being packed,

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observations were made of the color, texture, degree of honeycombing, and moisture.

Immediately after the meat of the tuna was placed in the cans, the cans were steamed under vacuum and then processed at 250° F. for 55 minutes in a retort controlled with a Taylor Instrument system SP-1. The cans were cooled under pressure at 17 psi. and then removed to storage at room temperature.

None of the cans was stored less than 1 month before being opened, at which time the vacuum was 13 inches of mercury. The lightness or darkness of the canned meat (Munsell value at 555 millimicrons) was evaluated according to the proposed tuna standards (Federal Register, August 28, 1956) by one of the authors at the laboratories of the Food and Drug Administration in Washington, D. C. Three cans (solid pack) packed from each fish were opened in the prescribed manner, and the meat was compared with neutral reflectance standards (Munsell value scale) under an optical comparator. One can packed from each fish (solid pack) was examined organoleptically at College Park by three persons. The organoleptic test sample of one can was adequate as the solid pack cans were uniform when packed. Scores of 0 to 100 were given for appearance, flavor and texture. A maximum score of 100 was assigned to represent excellence.

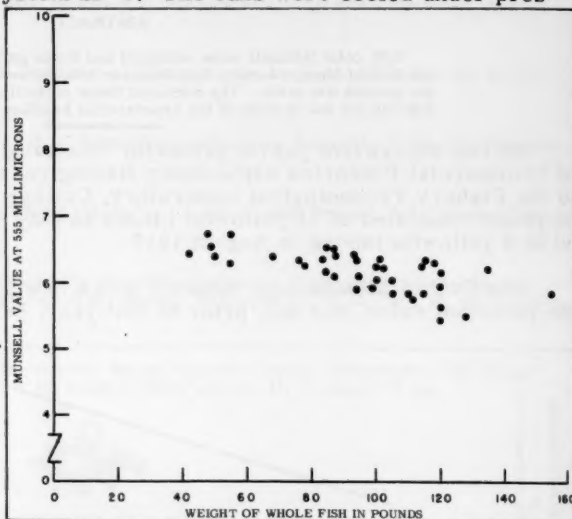


Fig. 2 - Munsell value as related to weight of the whole frozen fish.

Table 1 - Canned Product Evaluation Data on 31 Gulf of Mexico Yellowfin Tuna Caught in August 1956

Code Number	Weight of Whole Frozen Fish Pounds	Evaluation of Canned Products				
		Honey-combing 1/	Texture Score 2/	Appearance Score 2/	Flavor Score 2/	Munsell Value
		+ or -				
<b>Males:</b>						
2-10AA	83	-	90	87	87	6.37
2-10DA	85	+	97	93	93	6.57
2-5	95	-	83	70	77	6.1
1-3C	100	-	90	90	93	6.3
2-11BB	120	-	80	80	77	6.13
1-7	120	-	77	63	77	5.97
1-8	120	-	80	63	70	5.63
2-3A	120	-	73	63	77	5.47
1-5	128	-	50	27	37	5.5
1-10BB	135	+	90	87	90	6.2
1-3B	155	-	47	63	50	5.87
<b>Females:</b>						
2-11D	42	-	83	87	90	6.43
1-11DB	48	-	100	83	97	6.75
2-3C	49	-	93	97	90	6.57
1-11C	50	+	85	85	90	6.4
1-11DA	55	+	80	93	87	6.3
1-3DA	55	-	93	80	90	6.73
2-7	68	+	93	100	87	6.6
2-10DB	76	-	80	90	90	6.37
2-4	77	-	80	90	85	6.3
1-10DB	85	-	87	83	80	6.17
2-11AB	87	+	87	67	77	6.1
1-10AA	94	+	70	77	57	5.9
1-11B	100	-	80	77	80	6.27
2-10BB	100	+	66	53	57	6.07
1-10CB	105	+	80	77	83	6.03
1-10BA	105	+	83	73	80	5.87
1-11A	110	+	80	53	70	5.83
1-11A	110	+	73	57	70	5.8
2-3D	115	-	87	80	87	5.83
1-4	118	+	83	83	80	6.3

1/ - indicates honeycombing.  
2/ 100 indicates a perfect score.

1/ + indicates honeycombing.  
2/ 100 indicates a perfect score.

## RESULTS AND DISCUSSION

### QUALITY CHANGE NOTED WITH INCREASING WEIGHT:

The weight of fish was apparently the most important factor in determining the lightness or darkness and the flavor of the canned product. The data in tables 1 and 2 indicate that the meat in all of the cans examined would grade "light meat" according to the proposed standards; that is, the Munsell values determined on the opened cans all were above 5.3 at 555 millimicrons. Yet the data also indicate that some of the fish were of much lower quality than were others.

The data in figure 2 indicate an inverse correlation of Munsell value at 555 millimicrons

with weight of fish ( $r = -0.687$ ). The data in figure 3 indicate an inverse correlation between flavor and weight of fish ( $r = 0.558$ ). Both correlations are highly significant.

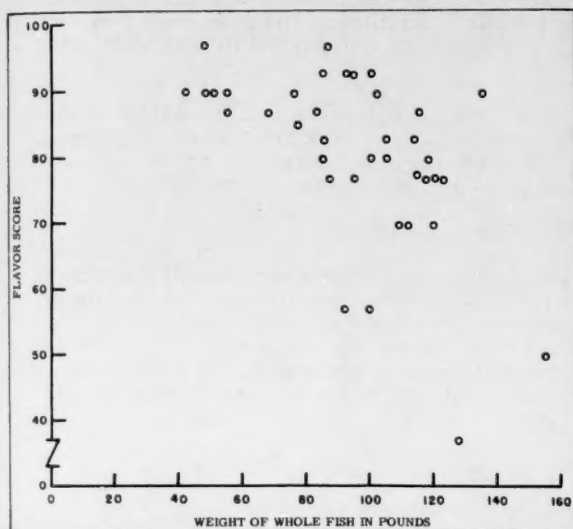


Fig. 3 - Flavor score of canned meat as related to weight of whole frozen fish. The flavor of excellent canned yellowfin was assigned a score of 100.

through a wire mesh screen preparatory to determination of the Munsell value. The texture score assigned refers to the eating quality and reflects the sum of subtexture factors of moisture, firmness, and toughness. As such, the texture score is not especially indicative of the textural changes associated with increasing weight of fish. With increasing weight of fish, the flavor of the pack changed from a pleasant, mild, tangy fish flavor to something quite flat and not characteristic of the best canned fish. It is interesting to note that the Munsell values and quality scores of the fish packed immediately after receipt are only slightly higher on the average than are those obtained for the fish canned 8 months after receipt.

#### ANOMALOUS FISH-

##### GREENING: The two females

1-10AA and 2-10BB, which yielded canned meat of marked low flavor, were of low quality after being precooked. Notes taken at the time described the loins as being honeycombed and dark tan with greening. The loins of 2-10BB were moist and slippery, whereas those of 1-10AA had a heavy custard-like curd between segments of muscle. Since no unusual conditions of handling were noted, the greening, in at least this case, was an unusual condition not related to the method of handling. No other fish had marked greening after being precooked. The lowest flavor score and one of the very low Munsell-value scores were found in meat packed from fish 1-5. Fish 1-5, after being precooked, had loins uniformly dark and with much gelatinous material between the segments of muscle. Fish 1-10BB received almost the same treatment, yet the canned meat scored unusually high both in flavor and in Munsell value.

These relationships were found even considering the variations in handling aboard the catch boat, which variations are known to occur in commercial catching practice. These variations included delays in putting the fish to freeze, the use of the brine or air well in freezing, and the stunning of hard-to-handle fish.

Examination after precook and examination of the resulting pack indicated that the color of the meat from the larger fish tended towards a dark tan color and the meat from the smaller fish tended towards light pink. Changes in texture also were found to be associated with increased weight. More moisture was retained in the larger fish after being precooked, and the larger fish were often slippery or spongy to the touch. Muscle fibers were longer and tougher as the fish became larger; thus it became increasingly difficult to rub the meat

Table 2 - Canned Product Evaluation Data on 8 Gulf of Mexico Yellowfin Tuna Caught in August 1957

Caught in August 1957						
Code Number	Weight of Whole Frozen Fish Pounds	Evaluation of Canned Products				
		Honey-combing <sup>1/</sup>	Texture Score <sup>2/</sup>	Appearance Score <sup>2/</sup>	Flavor Score <sup>2/</sup>	Munsell Value
<b>Males:</b>						
1	93	-	83	93	93	6.43
2	93.5	-	73	97	93	6.37
3	102	-	93	70	90	6.23
4	115	-	70	77	77	6.33
<b>Females:</b>						
5	86	-	83	93	83	6.53
6	87	-	97	93	97	6.5
7	90	-	63	43	67	5.93
8	114	-	80	83	83	6.3

<sup>1/</sup> + indicates honeycombing.  
<sup>2/</sup> 100 indicates a perfect score.

<sup>1/</sup> + indicates honeycombing.

<sup>2/</sup> 100 indicates a perfect score.

**HONEYCOMBING:** None of the honeycombing (marked + in tables 1 and 2) was of an extensive nature. Most often, the honeycombing appeared as a few small (less than  $\frac{1}{8}$ -inch diameter) voids between the large lateral muscles and the smaller lateral "eyes" at the extreme dorsal and ventral positions. The next most frequent location was in the region of the nape. None of the fish packed immediately after receipt had any evident honeycombing.

**YIELD:** Dark meat accounted for a constant 5.5 percent of the weight of the whole uncooked fish. The total light-meat scrap and dark meat was fairly constant at 11 percent of the weight of fish. The percentage of canned meat yield increased from 30 percent from a 60-pound fish to 38 percent from a 120-pound fish.

#### SUMMARY AND CONCLUSIONS

All of the Gulf of Mexico yellowfin tuna canned in this experiment could be graded as "light meat" according to the proposed tuna standards. The quality of the pack, based mainly on flavor and color, decreased from optimum with packs made from small fish towards less desirable flavor and color with packs made from the larger fish. This progressive decrease of flavor and color of canned meat with weight of fish overshadowed the effect, if any, of the variations in handling these yellowfin aboard the M/V Oregon.



#### TAGGED SAILFISH RECAPTURED TWICE

Sailfish evidently do not learn from experience, if they are to be judged by an authenticated story emanating from Palm Beach. The story relates that the same sailfish was caught by two different anglers fishing from two different boats on the same day, and there is no doubt that it was the same sailfish.

The sailfish, measuring 7 ft. 2 in. in length, was first caught by a woman fishing from the charter cruiser Bacardi in the morning of January 26, 1956. The fish was tagged with a Marine Laboratory, University of Miami, dart-type tag and released.

Just about noon of the same day, a sailfish, bearing a tag, was hooked, fought, and boated by another fisherman. Incredible as it may seem, the tag (Number 10180) was the one affixed to the sailfish  $1\frac{1}{2}$  hours earlier. The tag, along with an explanatory letter from the fishing editor of the Palm Beach Post-Times, was received at The Marine Laboratory by the research instructor on the Laboratory staff who is in charge of the sailfish tagging program.

To date, seven sailfish bearing Marine Laboratory tags have been re-caught and reported. So far, the sailfish tagging program at the Laboratory has been going on for 10 years, with about 2,550 sailfish tagged. Three types of tags have been used: (1) a monel-metal cattle ear tag that is attached to the pectoral fin of the fish prior to the release, (2) a neoprene ring tag that is slipped over the bill of the sailfish, and (3) a dart tag that is imbedded in the fish alongside the forward end of the dorsal fin. Four of the seven sailfish so far tagged and re-caught have borne the cattle ear tag, indicating that this is the best type of tag for sailfish. (The Marine Laboratory, University of Miami, Miami, Fla.)

## 1957: THE YEAR OF WARM WATER AND SOUTHERN FISH OFF CALIFORNIA COAST

### ABSTRACT

A preliminary report on oceanographic conditions and the pelagic fisheries of California during 1957 prepared for the Marine Research Committee by the agencies participating in the California Cooperative Oceanic Fisheries Investigations (CCOFI)<sup>1</sup>. The year 1957 was unusual compared with the last several years. The question seems to be whether 1957 is unusual or perhaps the only "normal" year in the past 10. Oceanographic and biological data are presented and discussed.

### BACKGROUND

By now it is common knowledge that climatically 1957 has been an extraordinary year. This condition seems to have been Pacific-wide: Hawaii had its first recorded hurricane; the Peruvian coast was afflicted with the fish-killing El Nino; the ice went out at Pt. Barrow at the earliest time in history; on the western edge of the Pacific, the tropical rainy season lasted almost six weeks beyond its usual term.

This widespread variation in the weather has manifested itself dramatically on a local scale. At La Jolla, for example, the temperature of the sea surface reached the highest averages during July, August, and September 1957 it had achieved in 26 years. Southern California has had one of its rainiest autumns in several years. By mid-December, for example, the weather station at Lindbergh Field, San Diego, had recorded 3.57 inches, against a normal (the mean from 1920 to 1950) to that date of 2.48 inches. Throughout the summer reports came in of the appearance in quantity of fishes that in recent years had been caught only as stragglers: by the end of September, the party boats had landed 2,805 dolphinfish against a previous high of 15 in 1947.

<sup>1</sup>/California Academy of Sciences; California Department of Fish and Game; Stanford University, Hopkins Marine Station; U. S. Fish and Wildlife Service, Bureau of Commercial Fisheries, South Pacific Fishery Investigations, University of California, Scripps Institution of Oceanography.

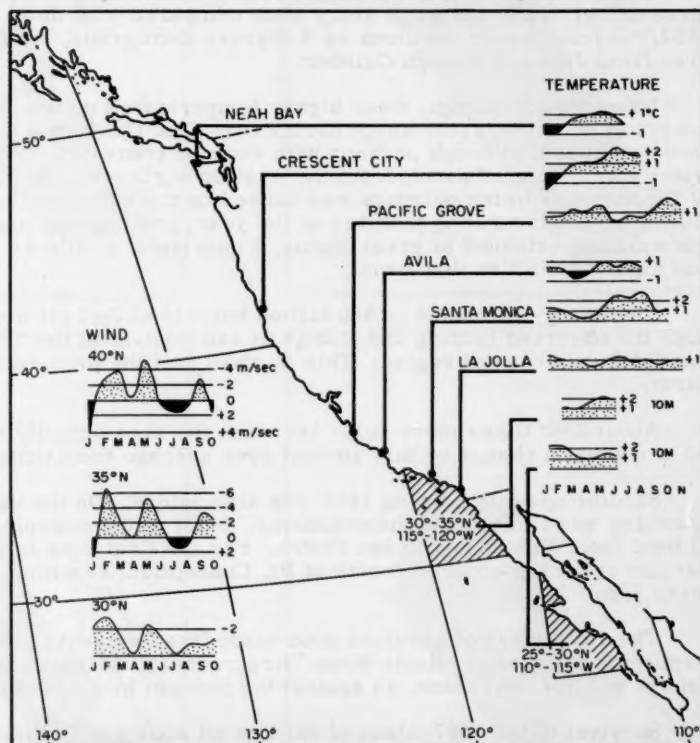


Fig. 1 - Temperature and wind anomalies at shore stations, 1957 compared to the 1949-56 means. Wind anomalies show variations in the northerly component of the geostrophic winds (computed from pressure charts). A negative anomaly means that the northerly component was weakened. Positive temperature anomalies indicate warmer water.



To the agencies conducting research under the California Cooperative Oceanic Fisheries Investigations, the year 1957 presents both an opportunity and a challenge. In previous years, large amounts of data were collected on the ocean and the fisheries, so that it has been possible to describe in considerable detail what has happened to oceanographic conditions since 1949. This material will now offer an invaluable basis of comparison with a year which differs strikingly from those immediately preceding but which may have been similar to others in the past for which not so large an amount of data exists. Thus, 1957 may offer an opportunity to explain both the immediate past and perhaps throw further light on the years of the thriving sardine fishery.

Some of the oceanographic data for 1957 are still being processed, but results already available for publication are striking. (Processing of the remaining 1957 data has been given priority over other processing.) Shore temperatures (which have proven to be useful clues to conditions offshore) have been higher than at any time throughout the 1949-56 period. The winds in 1957 had less of a northerly component than at any time during this period.

Sea surface temperatures for the entire CCOFI area are available for 1957 and these tell virtually the same story when compared with those for the period 1949 to 1954: warmer water, as much as 3 degrees Centigrade, prevailed over most of the area from January through October.

Interestingly enough, these higher temperatures do not necessarily mean that a wave of southern water swept northward. The California Current continued to flow southward, although perhaps with reduced transport. Most probably the warm water came from offshore, from the west or northwest. At most, only a small part of the increase in temperature was caused by the sun's heating in the CCOFI region. One of the most striking features of the year, preliminary analysis shows, is that the warming extended to great depths, a quarter of a mile or so. This warm water had higher salinities than usual.

The energy contained in 560 billion barrels of fuel oil would be required to produce the observed heating and change in salt content in the 200,000 square miles of the California coastal region. This is about half the total estimated oil reserves on earth.

About four times more solar heat than the area actually received would be needed to explain a change by this amount over average conditions.

Sardine spawning during 1957 was also unique. On the usual offshore grounds, spawning was limited and discontinuous. Most of the spawning took place in a coastal band from Punta Baja to San Pedro. For the first time in several years, some sardine spawning occurred north of Pt. Conception, reaching at least as far as Monterey Bay.

The 1957-class of sardines soon made itself evident in the live-bait fishery. Preliminary figures indicate these "firecrackers" will account for at least 6.0 percent of the live-bait catch, as against 0.3 percent in the best previous year.

Survival of the 1957-class of sardine off southern California has undoubtedly been better than in recent years. It is possible that the 1957-class will prove to be large. Judgment should be reserved, however, since these juveniles may have been overavailable during the year because of their inshore origin, and been oversampled.

The plankton collections so far examined reveal no striking changes from previous years, a fact of importance so far as the South Pacific Fishery Investigations are concerned, implying as it does that the distribution of these creatures may not be determined by surface temperatures.

The plankton collections do point toward a successful 1957-class of jack mackerel. An unusual abundance of larger jack mackerel larvae appeared in the collections.

So far as the fisheries are concerned, the most startling information for 1957 comes from the sport fishery. The year will unquestionably be the best for southern California anglers since party-boat records were re-established in 1947. Yellowtail have been caught off all southern California sport-fishing ports and in large

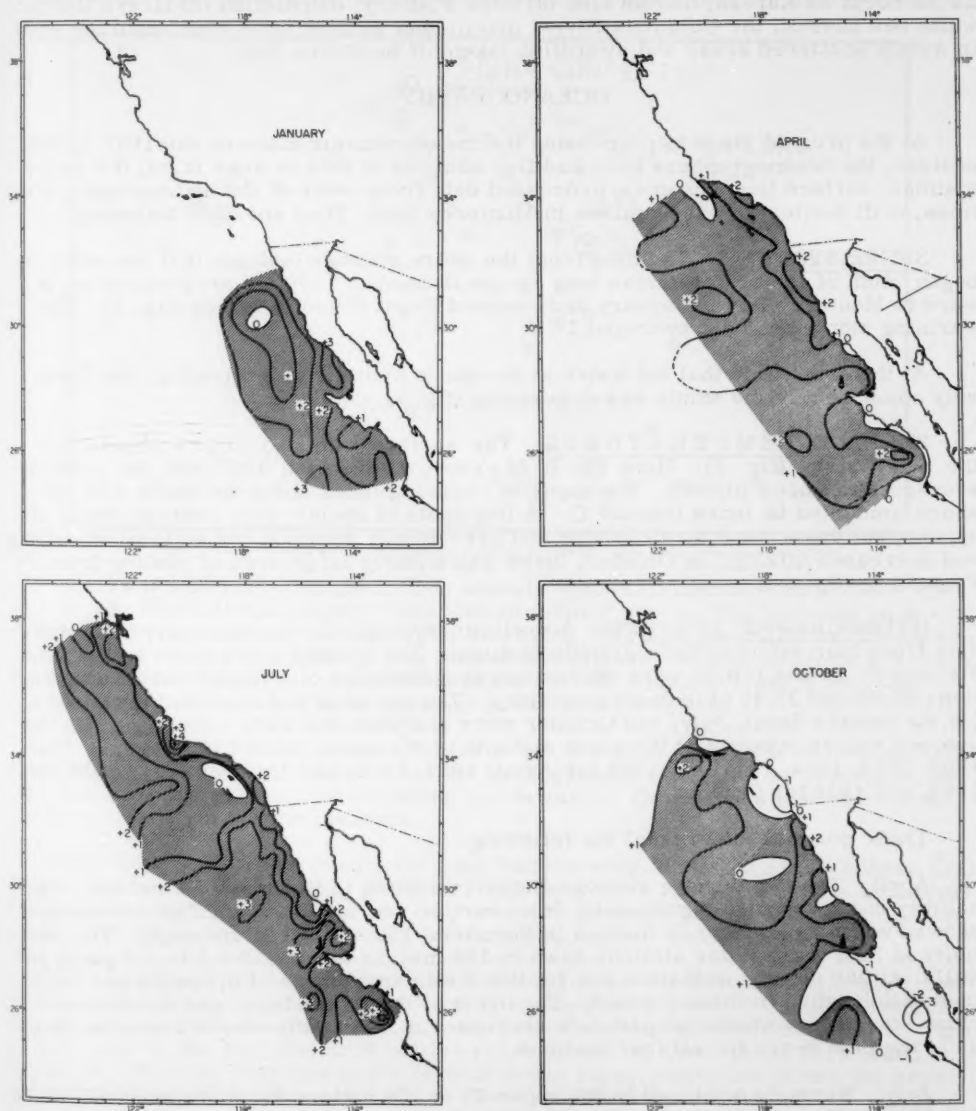


Fig. 2 - Differences between sea surface temperatures in 1957 and in earlier period. Upper left, January 1957 compared with 1949-55 average. Upper right, April 1957 compared with 1949-54 average. Lower left, July 1957 compared with 1949-54 average. Lower right, October 1957 compared with 1949-54 average. Differences are expressed in degrees Centigrade. Shading indicates warming.

numbers south of Port Hueneme, and the barracuda catch has also increased greatly over the past several years. More bonito and yellowtail have been taken by party boat anglers than in any year previously recorded.

Equally as remarkable as this upsurge in landings of game fish by sportsmen is the fact that many species have been taken much farther north than in recent years. White sea bass have been taken off the Golden Gate, for example; skipjack tuna, dolphinfish, and bonito were taken 30 to 80 miles off the Farallon Islands and as far north as Eureka; bluefin tuna off Cape Flattery; dolphinfish off Grays Harbor; white sea bass off the Columbia River; marlin and sailfish have been reported seen in widely scattered areas and swordfish taken off Monterey Bay.

### OCEANOGRAPHY

At the present stage of processing the measurements made on the 1957 CCOFI cruises, the oceanographers have had five sources of data to draw from, the shore stations, surface temperatures, processed data from some of the hydrographic stations, drift bottles, and the cruises in Monterey Bay. They show the following:

**SHORE STATIONS:** The data from the shore stations indicate that the warming began south of Port Hueneme as long ago as December 1956. It progressed northward to Monterey Bay in January and reached Puget Sound in March (fig. 1). The warming along the coast averaged  $1^{\circ}\text{C}$ .

At the same time that the water at the shore stations was warming, the northerly component of the winds was decreasing (fig. 1).

**SURFACE TEMPERATURES:** The surface temperature charts tell the same story (fig. 2). Here the differences between 1957 and the 1949-54 average have been plotted. Warming in various places along the coast and offshore amounted to more than  $3^{\circ}\text{C}$ . A few spots of cooler than average water do appear, but these were small in size and presumably were caused by local upwelling and decreased mixing. In October, there was a fairly large area of cooling from Pt. Eugenia southward.

**HYDROGRAPHIC STATIONS:** A preliminary analysis has been prepared of the data from four selected hydrographic stations. The locations are given in figure 3. Stations 80.90 and 100.70 were chosen as representative of offshore conditions, Stations 80.60 and 90.45 of inshore conditions. The physical and chemical properties for the months April, July, and October were analyzed and were compared with the average values obtained at the same stations in the same months in the years 1950, 1952, 1953, 1954, 1955, and 1956 for April; 1950, 1952, and 1953 for July; and 1952, 1954, and 1955 for October.

These comparisons reveal the following:

**April:** The two inshore stations showed warming in the upper 50 meters. The salinity did not change significantly from earlier years. The two offshore stations showed warming down to 75 meters in the north, 150 meters in the south. The salinity at both these latter stations down to 125 meters increased 0.2 to 0.3 parts per mille. At 200 meters at Station 100.70, there was an average of 0.3 parts per mille less salinity than in former years. The depth of the mixed layer and the thermocline--the region where temperature decreases most rapidly--were much the same as in the past years for all four stations.

**July:** Warming occurred in the upper 75 to 100 meters for Stations 80.60, 80.90, and 90.45. The salinity for the two inshore stations was little changed. At Station 80.90, offshore, the salinity increased an average of 0.35 parts per mille from the

surface to 100 meters, and 0.15 parts per mille from 100 to 150 meters. At 200 meters the salinity decreased over the other years by an average of 0.01 parts per mille. The oxygen values at Station 80.90 at 200 meters was much higher than usual, 4.0 milliliters per liter. The depth of the mixed layer was the same as in past years.

**October:** By October a very noticeable change had occurred from Pt. Conception to Pt. Eugenia. The temperatures at the four stations increased as deep as 400 meters with Station 80.90 having the largest increase. At 50 meters, the depth of the mixed layer, the temperature was over  $2^{\circ}\text{C}$ . higher than the average, and at

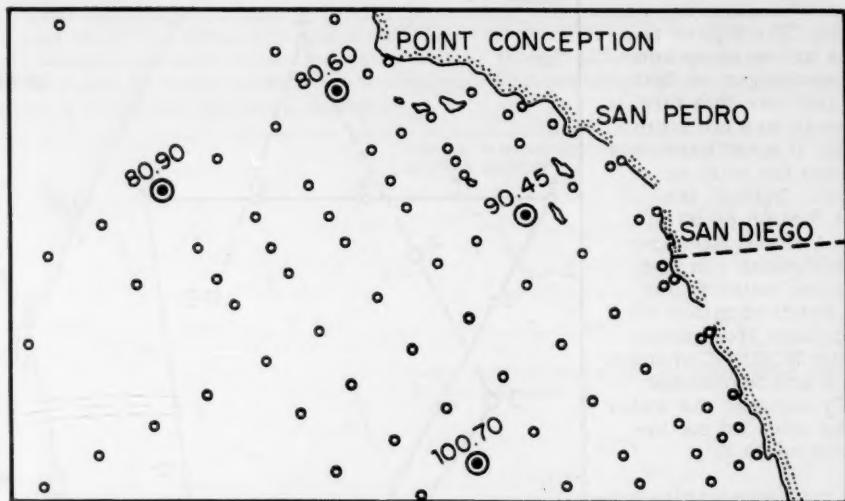


Fig. 3 - Location of four hydrographic stations for which 1957 data have been analyzed.

150 meters it was  $1.8^{\circ}\text{C}$ . higher. The salinity also increased for all stations except 90.45, where it was slightly less than in former years. The increase in salinity was the greatest at Station 80.90, averaging 0.4 parts per mille to 125 meters. Again at this station the salinity was less at 200 meters, by an average of 0.2 parts per mille. The oxygen value at Station 80.90 was 4.6 milliliters per liter. The mixed layer was the same as in previous years at all stations.

**DRIFT BOTTLES:** At present, clues to the currents during the year come only from the drift-bottle experiments, as the hydrographic data must be processed before the standard current computations can be made. Other clues will come from the further analysis of the plankton.

The drift-bottle experiments indicate that the eddy often found off southern California was in existence during November and December 1956, and during June, July, October, and November 1957. The eddy was not observed during February, March, April, and May. There are no data for January, August, and September.

The Davidson countercurrent, which sweeps along the central California coast during some months, usually in the winter, was apparently active during November and December 1956 and February, March, July, October, and November 1957. This is indicated by the fact that drift bottles released off Pt. Conception were found to the north. The two previous years of drift-bottle experiments had shown the presence of the countercurrent only in November and December.

Though warming began in the south and shifted northward in time, there is no indication that southern water moved northward. Study of the zooplankton shows no

species from other areas. The northerly winds were greatly reduced in the first part of the year. This may have retarded the normal transport of water along the coast allowing advection of warmer offshore water into the region off southern California and Baja California. The slight increase in salinity at Station 80.90 in April and the larger increase at Station 100.70 indicate that water from farther west than usual was in fact present. By July, Station 80.90 more clearly shows the presence of a different water mass. The higher temperature and salinity and the higher oxygen at 200 meters indicate that this water mass was not from the south; it must have come from the west or northwest. Indeed, the water at Station 80.90 in July and October strongly resembles the warmer, more saline water found several hundred miles offshore of Cape Mendocino during the NORPAC cruises of August and September 1955. By October the water mass had affected the in-shore Station 80.60.

We may summarize our conclusions to date by saying that the water was warmer, the northerly winds reduced, and that the warm water did not seem to come from the south, but at present we do not understand the combination of the oceanographic and meteorological mechanisms by which these changes took place.

**CRUISES IN MONTE-REY BAY:** Monterey Bay is historically one of California's richest fishing grounds. It is broadly open to the sea, and conditions in the Bay therefore reflect to a large extent the conditions which occur in the offshore waters of central California.

Since 1951 the Hopkins Marine Station of Stanford University has operated for CCOFI what amounts to an oceanographic "weather station" on Monterey Bay, with approximately weekly cruises that sample the water conditions and plankton organisms at several points in the bay (fig. 4). The Department of Fish and Game biolo-

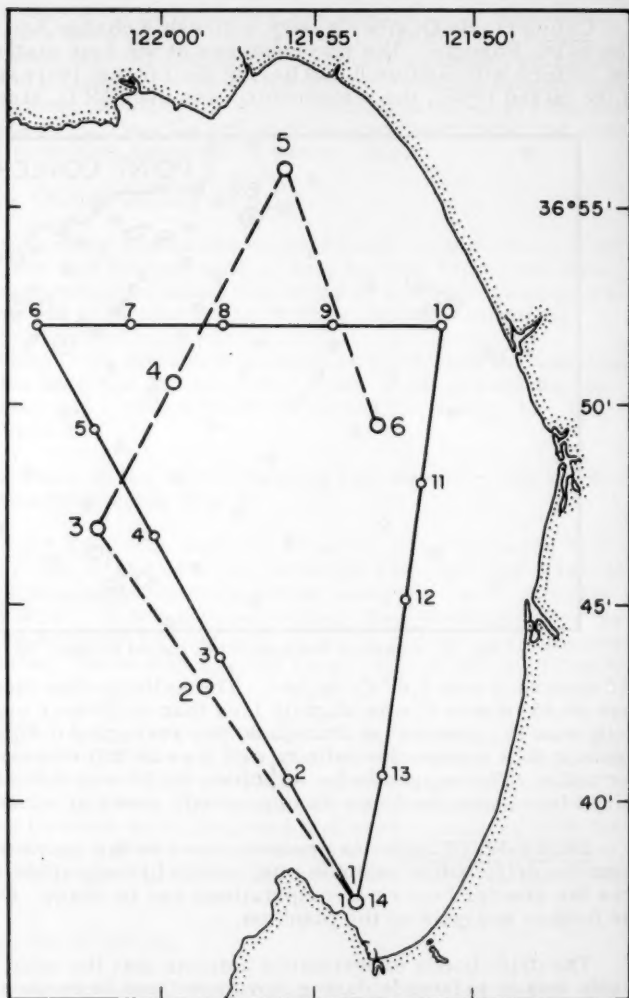


Fig. 4 - Path of regular oceanographic cruises in Monterey Bay. The solid line and small numbers show the cruise pattern and stations occupied at approximately weekly intervals from September 1951 to February 1954. The broken line and large numbers represent the cruise pattern and stations similarly occupied during the period March 1954 through November 1957, and continuing. At each station the vessel records weather and water temperatures, and takes water samples and plankton hauls for analysis.



gists, also located at the Hopkins Marine Station on Monterey Bay, have followed conditions and catches of the fishery in this area, and conducted aerial surveys of pelagic fish schools in the region from San Francisco south to Point Conception.

**Warmer Water Conditions:** Monterey Bay and the ocean beyond have shown a definite trend toward warmer conditions since 1955. The year 1955 was cold, with surface temperatures rarely rising above  $14^{\circ}\text{C}$ ., even in inshore waters (fig. 5). September and October, nearly always the two warmest months of the year, showed monthly average temperatures on the bay of  $13.1^{\circ}\text{C}$ . The year 1956 was warmer, with September and October average surface temperatures of  $14.6$  and  $14.9^{\circ}\text{C}$ . The year 1957 has been warmer yet, with September and October monthly averages of  $15.7$  and  $16.4^{\circ}\text{C}$ ., some two and a half degrees warmer than in 1955. Changes in other seasons parallel those indicated above, though differences in winter temperatures are not as large as those given above. For oceanographic conditions this represents a fairly conspicuous change.

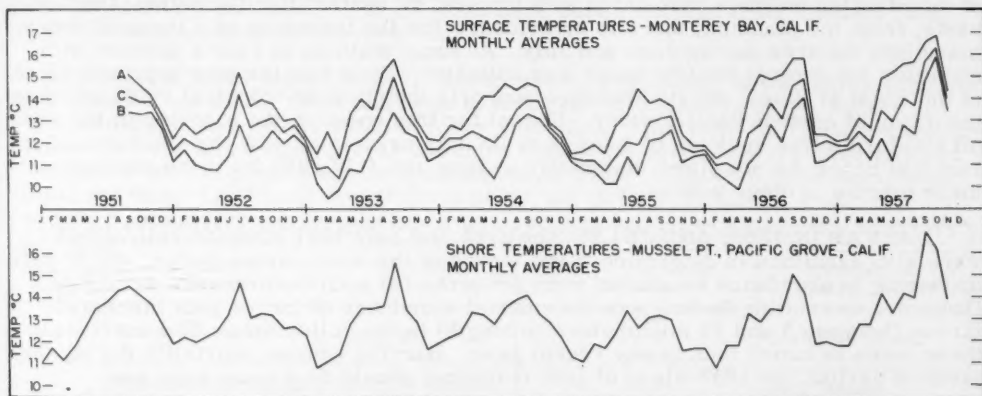


Fig. 5 - (Top) Surface temperatures, Monterey Bay (monthly averages in degrees Centigrade). Curve A--Monthly averages of the highest surface temperature recorded during each weekly cruise. Curve B--Monthly averages of the lowest surface temperature recorded during each weekly cruise. Curve C--Monthly average of all surface temperatures recorded during each weekly cruise. The surface temperatures in Monterey Bay show a characteristic pattern of change through the year. During the fall and winter months there is little temperature variation from place to place in the Bay. Conversely, during the period March through July or August the range of temperatures encountered during any particular cruise is relatively great. This increased temperature range during spring and summer results from a combination of upwelling in the center of the Bay and surface warming in peripheral areas. Cold waters rise in a slow fountain from the Monterey submarine canyon in the center of the Bay, and move toward the shores, gradually warming as they spread. For the cruise patterns used, the range of surface temperatures encountered on a particular day provides a good indirect measure of the amount of upwelling occurring. Curves A and B approach each other rapidly as upwelling ceases. The chart shows a clear shift toward warmer conditions in the surface waters of the Bay since 1955. (Bottom) Shore temperatures, Mussel Point, Pacific Grove (monthly averages in degrees Centigrade). Curve D shows monthly averages of the shore temperatures at the southern end of Monterey Bay, based on daily measurements recorded by Hopkins Marine Station for the Scripps Institution of Oceanography. As do the surface temperatures of the Bay, the shore temperatures show a clear trend toward warmer conditions since 1955. The warmer conditions in 1957 were accompanied by indications of a good spawning of anchovies in the months of May and June, and a light spawning of sardines (the first recorded off Monterey since 1950) in the same period. Young current year-class anchovies and sardines entered the Bay in numbers in September and October.

### BIOLOGY

**SARDINE SPAWNING:** Sardine spawning during 1957 was also unique. On the usual offshore grounds, spawning was limited and discontinuous. Most of the spawning took place in a coastal band from Punta Baja to San Pedro (Station lines 90-107).

For the first time in several years, some sardine spawning occurred to the north of Pt. Conception. Sardine eggs and/or larvae were taken at five stations on lines 67 to 77 in June. Spawning north of Pt. Conception was observed in July, the northernmost locality being off Monterey Bay.

Sardines of the 1957-class were taken in the live-bait fishery and were commonly observed by sardine fishermen fishing out of Port Hueneme. Sardines of the 1957-class have also been reported from north of Pt. Conception at least as far north as Monterey Bay.

Survival of the 1957-class of sardines off southern California has undoubtedly been better than in recent years. It is possible that the 1957-class will prove to be a large one. Judgment should be reserved, however, since these juveniles may have been overavailable owing to their inshore origin, and been oversampled.

**PLANKTON COLLECTIONS:** A number of plankton samples collected off California during the June and July cruises of 1957 have been examined in order to determine if there was anything unusual about the distribution of plankton organisms during this period. Inasmuch as there had been marked incursions of warm water fish into the area, it was of interest to ascertain whether there were also incursions of the plankton animals associated with tropical or central Pacific water. On this basis, from the plankton, there is no evidence for the incursion of a tropical water mass into the area during June and July. At some stations in June a species with affinities for central Pacific water was collected. This species may approach close to the coast at times, but its presence supports the physico-chemical evidence of an incursion of central Pacific water. Except for this species, the plankton in the area off California was made up of species ordinarily associated with the California Current and hence did not differ materially in June and July 1957 from the plankton of these months in other years.

**LARVAE IN JUNE AND JULY:** The June and July 1957 plankton collections were also examined to determine if the larvae of the warm water fishes, which were appearing in abundance as adults, were present. No such occurrences were noted. However, an exciting finding was the unusual abundance of larger jack mackerel larvae (between 5 and 10 millimeters in length) in the collections. The survival to these sizes is better than in any recent year. Barring unusual mortality during the juvenile period, the 1957-class of jack mackerel should be a successful one.

**THE FISHERY:** Despite the earlier starting date (September 1) in 1957, a dispute on price kept the San Pedro sardine fleet idle and as of November 1, 1957, a price settlement had not been reached; consequently, the vessels fishing out of Port Hueneme and Santa Barbara landed almost the entire catch. The sardines appeared to be widely scattered and not very abundant in 1957.

**AERIAL SURVEYS:** Results of the two first aerial surveys in 1957 showed a decrease of anchovy stocks coastwide, especially in central California; however,

Table 1 - Total Annual Party-Boat Catch of Several Species,  
1947 through September 1957

Year	Barracuda	Yellowtail	Bonito	Tuna		Dolphinfish	Angler Days
				Yellowfin	Skipjack		
(Number of Fish)							
1957 <sup>1/</sup>	490,075	176,849	186,587	425	6,417	2,805	-
1956	87,603	29,198	61,404	78	13	2	523,063
1955	154,962	36,468	22,409	1	10	0	496,286
1954	282,552	40,872	70,078	0	50	12	532,190
1953	170,550	27,702	6,321	0	279	0	502,146
1952	336,550	59,263	7,649	34	38	2	562,898
1951	269,545	23,721	14,475	56	132	0	556,949
1950	256,367	6,971	2,359	6	31	1	544,264
1949	366,423	17,710	5,372	11	9	0	469,915
1948	384,056	13,028	14,519	18	460	0	407,757
1947	677,449	6,948	36,496	137	698	15	359,436

<sup>1/</sup>Through September, preliminary report.

<sup>1/</sup>Through September, preliminary report.

there are good indications that the 1957-class should be a strong one, particularly off central California.

It is noteworthy that on Flight 57-2 (May 14-24), a school group of sardines appeared in the area around the Coronados Islands and Pt. Loma. These fish were reported about May 1 by commercial aerial spotters and samples of the live bait collected at San Diego proved them to be nearly all of the 1955-class. Over the past three seasons sardines were not seen on aerial flights until late in June.

**BAIT SAMPLING:** In 1957 there has been an enormous increase in the percentage of young sardines ("firecrackers") in the live-bait catch. Firm figures are not yet available, but it appears that the "firecrackers" may exceed 6.0 percent (as against 0.3 percent for 1955, the best previous year for which records were taken). Even more significant is the fact that these sardines of the 1957-class have been taken by the live-bait fleet off all sportfishing ports from San Diego north to Morro Bay. In addition, the sardines of the year have been collected from Monterey Bay for the first time in several years.

**THE SPORT FISHERY IN 1957:** Aside from the obviously better survival of the 1957-class of sardines, there has been in this year of unusually warm waters a phenomenal increase in the catch of many sport fish. The year 1957, unquestionably, will be the best sport-fishing year southern California ocean anglers have enjoyed since party boat records were re-established in 1947. Yellowtail have been caught off all southern California sportfishing ports and in large numbers south of Port

Table 2 - Preliminary List of Other Warm-Water Species Taken in California Waters in 1957

Number Taken in 1957	Common Name	Scientific Name	Years Formerly Reported	Location of Capture in 1957
1	Bullet mackerel	<u>Auxis</u> sp.	1918 1919 1935	Coronado Island
2	Sharpchin flyingfish	<u>Fodiator acutus</u>	1931	Long Beach
1	Tai or Porgy	<u>Calamus brachysomus</u>	1953?	Oceanside
1	Shortnose spearfish	<u>Tetrapturus angustirostris</u>	(Never previously taken off California)	60-mile bank
1	Spiny trunkfish	<u>Lactoria diaphanus</u>	1932 1933 1949 1/1951	Santa Monica Bay
1	Pilotfish	<u>Naucratus ductor</u>	1926 1936 1945	San Clemente Island
3	Triggerfish	<u>Verrunculus polylepis</u>	1924 1931 1946 1950 1/1951	Santa Monica Bay, Laguna Beach, and San Diego
1	Monterey Spanish mackerel	<u>Scomberomorus concolor</u>	1931 1937 1939 1944 1947 1948 1949 1/1951	Santa Barbara
1	Green jack	<u>Caranx caballus</u>	1858 1924 1945 1953 1/1955	Belmont Shore

1/Probably other years, also.

Hueneme, and the barracuda catch has also increased greatly over the past several years. More bonito and yellowtail have been taken by party boat anglers than in any year previously recorded.

The catch in numbers of several game species from 1947 through September of 1957 are shown in table 1.

Even pier anglers were able to snag small (1957-class) sardines for bait to catch large numbers of bonito and occasional barracuda.

In addition to the good fishing for yellowtail, barracuda, and bonito, party boats also encountered skipjack tuna and dolphinfish in greater amounts than during the past 10 years, and they occasionally landed yellowfin tuna.

Equally remarkable as this upsurge in landings of game fish by sportsmen is the fact that many species have been taken much farther north than in recent years. White sea bass have been taken off the Golden Gate in fair numbers both by sportsmen and by commercial fishermen trolling for salmon. A rather substantial sports fishery for white sea bass began in Monterey Bay. Meanwhile, commercial albacore fishermen were taking skipjack, dolphinfish, and bonito 30 to 80 miles off the Farallon Islands and as far north as Eureka.

Biologists from Oregon and Washington have reported bluefin tuna taken by commercial fishermen off Cape Flattery, skipjack as far north as Cape Blanco, dolphinfish off Grays Harbor, and white sea bass off the Columbia River. Unusually warm sea temperatures have been reported all along the coast by the albacore fishermen in the former offshore albacore fishing areas. Marlin and sailfish have been reported seen in widely scattered areas and swordfish have been taken off Monterey Bay.

In addition to the warm-water species listed in table 2, hammerhead sharks were seen frequently in California waters during 1957 and many were caught. Several green sea turtles were taken, especially by bait haulers in Los Angeles Harbor, and others have been reported sighted as far north as the Farallons.

At Pismo Beach the set of Pismo clams in 1957 was the best to occur at that locality in the past 10 years. This set compares favorably with the best sets since the Department's Annual Pismo Clam census was inaugurated in 1923.

The year 1957 was, indeed, unusual compared with the last several years, and sportfishing seems more nearly like it was in the years prior to World War II. The question seems to be whether 1957 is unusual or perhaps the only "normal" year in the past 10.



#### DRY FISH SILAGE

A dry fish silage feed which can be sold in paper sacks and which has good keeping quality has been produced in Denmark.  $H_2SO_4$  silage is mixed with drier materials, such as wheat bran, alfalfa meal, etc., the resulting mixtures containing 40 to 50 percent water. Mold growth is prevented by addition of mold inhibitors (Arsberetning fra Fiskeriministeriets Forsegslaboratorium for 1955, Copenhagen, Denmark).



### ENZYMES IN FISH TISSUE UNDER STUDY

Applied research to be effective must have a foundation of fundamental information derived from basic research. Enzymes, for instance, must be studied at a basic biochemical level in order to establish a foundation for sound research on effects of such chemical entities at the applied level.

The action of the enzymes in fish tissue is important both to the life processes of the fish and to the changes that take place in the fish after death. A knowledge of the intermediary metabolism of fish would help research workers to understand the details of the reactions involved both in the synthesis and in the breakdown of proteins, fats, and carbohydrates. The potential applications of this knowledge are in the fields of fish nutrition and in the commercial handling of fish and fishery products.

As part of a collaborative research project between the Department of Food Technology of the University of California and the U. S. Bureau of Commercial Fisheries' Fishery Technological Laboratory at Seattle, Wash., a study is being made of the oxidative enzymes of fish. Knowledge of such enzymes is applicable in two areas of interest to fishery technology: (1) the nature and properties of enzymes that are active after the death of the fish and (2) the enzymes and pathways of intermediary metabolism in fish.

The nature and properties of the enzymes that are active after death are important because of their potential effect on fish held in refrigerated storage. The potential changes may be either detrimental or beneficial to the final product. In either case, an understanding of these changes is necessary if they are to be controlled.

Early in the collaborative investigations, it became apparent that knowledge of the fundamental pathways of metabolism in live fish was essential to understanding the actions of the surviving enzymes. The work therefore has been concentrated on the enzymes of intermediary metabolism of fish, with emphasis on oxidative enzymes.

Carp were used as the test fish in the investigations because they are available and relatively easy to maintain in aquaria.

The initial approach to the problem was to compare directly the reactions caused by the enzymes in fish with those caused by the enzymes in mammals. The research to date has been concentrated in the areas of carbohydrate metabolism and of fatty acid metabolism. Results now available indicate that the tricarboxylic acid cycles of carbohydrate metabolism in fish is similar to that in other animals.

The multienzyme system that causes the oxidation of fatty acids in fish tissue was studied in detail. In general, the behavior of this system has been found to resemble that observed in mammals, but with some differences in detail.



The work now in progress essentially is an extension of the work already reported. Because of the importance of unsaturated fatty acids in fish, the investigation of the oxidation of the highly unsaturated fatty acids will be intensified in the near future.



## IMPROVED HANDLING OF FISH ABOARD

### MASSACHUSETTS FISHING VESSELS

During the period June 18, 1957 to June 18, 1958 a contract was in effect between the U. S. Bureau of Commercial Fisheries, Branch of Technology, and the Division of Marine Fisheries, Department of Natural Resources, Commonwealth of Massachusetts. Funds were provided under the terms of the Saltonstall-Kennedy Act of 1954. The purpose of this contract was to improve the handling and icing of fish at sea aboard vessels of the Massachusetts commercial fishing fleet. Details of the project were administered through the Division of Marine Fisheries, Massachusetts Department of Natural Resources, under the general supervision of the Bureau's Technological Laboratory in East Boston, Mass.

Under the terms of the contract an experienced man was assigned to instruct fishing vessel crews at sea in the best methods of handling their catch, particular attention being paid to the icing and stowage of fish in the hold. In addition, conditions aboard each vessel were noted and recommendations were made to the owners with regard to improvements and modifications.

Sixteen trips were made during the period under consideration, twelve of these on steel otter trawlers of the Boston fleet. Of the remaining four trips, three were aboard large wooden draggers (OTM) fishing out of Boston, and the fourth on a sea-scalloper based at New Bedford.

Results of the project, with respect to cooperation by fishermen and boat owners, were distinctly encouraging. Only two cases of indifference to suggestions were reported, and three other instances were cited where crew members were not wholly in accord with the aims of the program. Sellovers and condemnations of fish could largely be associated with poor icing and handling practices at sea and/or bad hold conditions, arising from such causes as infrequent cleaning and painting, mutilated pen boards, inadequate shelving, etc.

By mutual agreement, the contract has been renewed for another year. Emphasis will be placed on the training of fishermen engaged in the whiting and ocean perch fisheries. Good fish-handling techniques are known and can be easily taught. If reasonable care is taken of the catch at sea, the landing of a first quality product is inevitable.

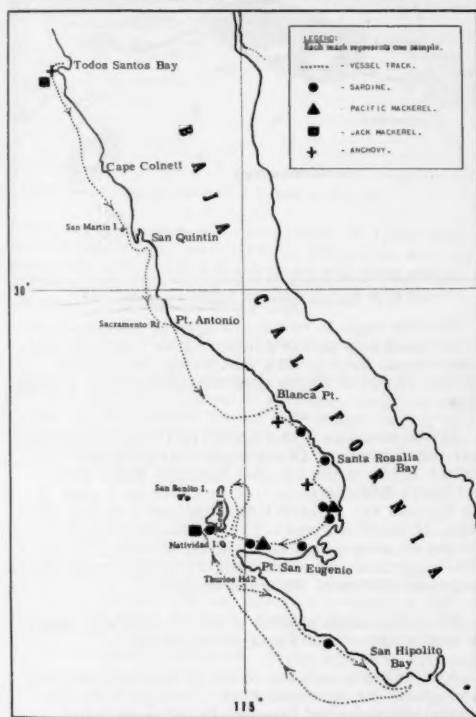
--By Frederick C. Wilbour, Jr., Director  
Division of Marine Fisheries,  
Commonwealth of Massachusetts



# TRENDS AND DEVELOPMENTS

## California

**SPAWNING SARDINES SURVEYED OFF COAST OF CALIFORNIA (M/V N. B. Scofield): Cruise 58-S-1, February 21-28, 1958: The coastal waters**



M/V N. B. Scofield) Cruise 58-S-1, February 21-28, 1958.

from one-half to 30 miles offshore of Baja California from Ensenada to Ballenas Bay were surveyed by the California Department of Fish and Game research vessel N. B. Scofield to locate and sample spawning populations of sardines for age composition and subpopulation studies. This cruise, the first of its type and exploratory in nature, was planned to develop techniques and methods of effective sampling of spawning sardines.

Other objectives included: (1) collection of live sardines for genetic subpopulation studies by the U. S. Bureau of Commercial Fisheries; (2) collecting blood serum from yellowtail and bonito to be used in genetic studies on sardines; (3) experimentation with different colored lights for attract-

ing fish; and (4) collection of specimens as requested by other departmental investigations.

Fishing stations were made at night on visually-located schools and in previously productive bays. Stations were also occupied where plankton tows yielded sardine eggs and larvae. A 1,500-watt light was used for attracting the fish and a blanket net or snag gangs were used for sampling.

A total of 55 fishing stations was occupied and sardines were taken at 9, northern anchovies at 3, Pacific mackerel at 2, and jack mackerel at 2. All fish taken except 2 samples of anchovies were caught within 5 miles of shore. Most of the sardine samples were taken in Sebastian Viscaino Bay.

In the 803 miles scouted on the cruise, 28 schools of pelagic fish were observed; 26 were identified as sardines and 2 were unidentified. Most of the sardine schools were sighted in the vicinity of Cedros Island and several at Soledad and Ballenas Bays. California gray whales were observed frequently during the cruise. The greatest numbers were observed near Scammon Lagoon and Asuncion Island.

No ripe-running sardines were taken, but a large percentage were in a gravid condition. The largest sardines taken were from Sebastian Viscaino Bay. Plankton tows produced sardine eggs and larvae in 9 of 14 tows. Anchovy eggs were present in large numbers at several locations in Sebastian Viscaino Bay.

Observations on the behavior of sardines and their reaction to types of gear were made as a basis for developing an effective sampling tool.

Although offshore plankton tows yielded sardine eggs and larvae, no fish were observed or caught. The larger sardines caught inshore were feeding vigorously on the surface and were captured easily with snag gangs and blanket net. The smaller fish stayed deep and could be caught only with much difficulty in the blanket net. Sardines were taken in 9 of 13 locations where sampling was attempted. Visually-located schools either ignored the attracting light or remained at such a distance as to make capture improbable.

Offshore operations were greatly hampered with all types of gear available due to weather conditions. Blanket-net sets offshore were made difficult because of roll and drift of the vessel.

Limited experiments with colored lights were conducted. Green and blue lights were used simultaneously with a standard 1,500-watt white

light. Observations were made on the degree of attraction and behavior of fish under each light. Colored lights were used both above and below water. In the experiments conducted, the white light apparently was much superior in attracting fish. There was some evidence that the green light was slightly superior in attracting larval fish.

Surface water temperatures ranged from 14.9° C. (58.8° F.) at Cape Colnett to 20.0° C. (68.0° F.) off Asuncion Bay. Bathythermograph casts indicated subsurface waters varying but little from surface temperatures to a depth of nearly 200 feet.

**Cruise 58-S-2, March 12-28, 1958:** The second in this series of cruises was made in the coastal waters from San Pedro to Point Buchon and the waters around Santa Catalina, San Clemente, Santa Cruz, Santa Rosa, and San Miguel Islands. The objectives were: (1) to locate and sample spawning sardines in order to determine their age and length composition, and to attempt to distinguish between sardines spawning in different areas or at different times; (2) to collect live sardines for genetic studies by the U. S. Bureau of Commercial Fisheries; and (3) to observe the behavior of spawning sardines in order to develop more efficient sampling techniques.

Two methods were used in locating fish: (1) a light station; and (2) visual scouting while under way. The methods were used alternately beginning with a light station at the anchorage of the previous day.

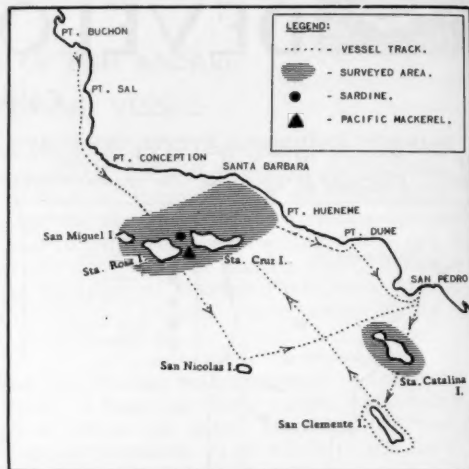
At each light station: (1) A 10-minute oblique plankton tow was made with a standard 1-meter plankton net from a depth of 20 meters to the surface. (2) After the plankton tow was completed, the vessel was allowed to drift and a 1,500-watt incandescent light was suspended above the surface of the water for a period of time--up to one hour. (3) While the light was turned on, the surface water temperature and the water temperature at 10 meters was measured; a bathythermograph was made; and the plankton sample was examined for the occurrence of sardine eggs and larvae. (4) If fish appeared under the light, attempts were made to catch them with blanket net, snag gangs, baitless lures, or dip nets.

Visual scouting consisted of observing fish schools while the vessel was under way or by detecting schools with the recording echo-sounder. When a school of fish was sighted or detected on the echo-sounder, the vessel was stopped and a light station was made.

Locating and sampling spawning groups of sardines was severely hampered by a series of storms which occurred throughout the survey period. Most

of the work was accomplished during calm periods between the storms.

Scattered and isolated schools of fish were observed between Pt. Buchon and San Pedro. Schools were more numerous between Pt. Sal and Pt. Arguello and around the Channel Islands.



M/V N. B. Scofield Cruise 58-S-2 (March 12-28, 1958).

Sardine eggs in various stages of development were found only in the plankton tows made around Santa Cruz, San Nicolas, and Santa Catalina Islands--27 out of 50 plankton tows contained sardine eggs.

Sardines came to the night light on only 2 of the stations occupied. One sample was obtained at a station made in the channel between Santa Cruz and Santa Rosa Islands. At this station 3 sets of the blanket net yielded 1 sardine and 1 saury; however, 16 sardines and 1 Pacific mackerel were caught on snag gangs and 1 squid was dip-netted. These sardines were between 6½ inches to 9½ inches long (158-222 mm. standard length).

The other light station at which sardines appeared was southwest of Santa Rosa Island.

Anchovy larvae were found in the plankton tows throughout the surveyed area. The greatest concentration occurred between Pt. Hueneme and Santa Barbara.

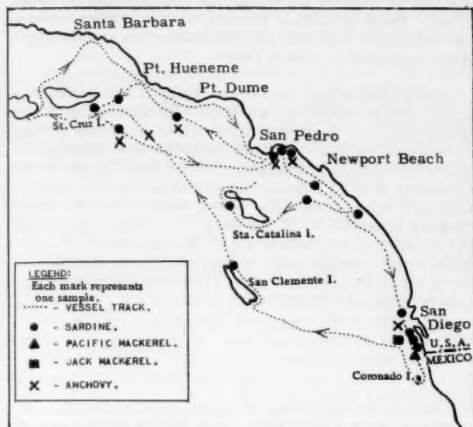
The sea surface temperatures ranged from 13.1° C. to 15.5° C. (55.6° F. to 59.9° F.).

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**SPAWNING SARDINES SURVEYED IN SOUTHERN CALIFORNIA WATERS BY M/V ALASKA:** Cruise 58-A-1, April 12-30, 1958: The first of a series of cruises was made by the California Department of Fish and Game research vessel *Alaska* off the coast and islands of southern California from Santa Barbara to the Coronado Islands. The objectives were: locate and sample spawning

sardines in southern California waters as a part of age composition and subpopulation studies; (2) develop methods of capturing spawning sardines; (3) collect live sardines for genetic subpopulation studies by the U. S. Bureau of Commercial Fisheries; and (4) collect specimens as requested by other departmental investigations.

Fishing stations were occupied in areas where fish were observed visually or detected by echo-sounding or echo-ranging devices. Other stations



M/V *Alaska* Cruise 58-A-1 April 12-30, 1958

were occupied at certain locations. A 1,500-watt incandescent light was used for attraction and capture was made with a blanket net and snag gangs. Plankton tows for eggs and larvae were made as an aid in locating spawning fish.

A new use of the blanket net was employed on this cruise. A section of black  $1\frac{1}{4}$ -inch mesh webbing was added which made it possible to use the net as a gill net. Whenever sardines could not be caught by the normal use of the blanket net, it was hung vertically over the side of the vessel and the attracting light dimmed. The  $1\frac{1}{4}$ -inch mesh section thus fished as a gill net.

Sardines were present at 18 of the 72 fishing stations occupied and were captured at 16 stations--the largest number of sardine samples taken in southern California waters since 1951. Sizes ranged from 129 mm. to 244 mm. standard length--80 percent of the fish sampled were between 145 mm. to 175 mm. No ripe-running female fish were caught, but most of them over 175 mm. in length were in a gravid condition. Many sardines between 145 mm. and 175 mm. were gravid. All fish under 145 mm. were sexually immature.

In the 381 miles scouted, 38 sardine-schools were observed. All but 6 were small--less than 3 tons. The small schools were most numerous from Huntington Beach to San Mateo Point and offshore to Lasuen Seamount. The 6 large schools were observed near Santa Cruz Island.

In addition to sardines, 26 schools of sauries, 5 of anchovies, and 26 unidentified schools were observed; and 6 samples of anchovies, 1 of jack mackerel, and 1 of Pacific mackerel were collected.

The blanket net with the modification for use as a gill net operated with encouraging results. Although only a few full 50-fish samples were taken, there were only two occasions when the net failed

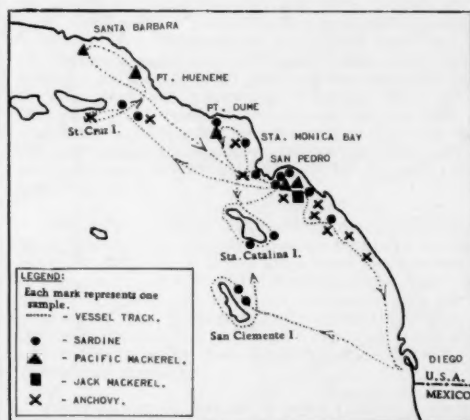
to catch fish when sardines were present beneath the attracting light.

Due to adverse weather conditions, investigation was curtailed in the Santa Cruz Basin and the Tanner-Cortez Bank area. Surface water temperatures ranged from a high of 68° F. at San Diego to a low of 51.8° F. at Santa Rosa Island.

Cruise 58-A-2, May 12-28, 1958: The second of this series of cruises was made off the coast and islands of Southern California from Santa Barbara to San Diego. The objectives were: (1) to locate and sample spawning sardines in order to determine their age and length composition, and to attempt to distinguish between sardines spawning in different areas or at different times. (2) to continue gear experimentation in an attempt to increase sampling efficiency; and (3) to collect specimens of barracuda and white sea bass wherever possible.

Of 71 light stations occupied, sardines were taken at 14, northern anchovies at 10, Pacific mackerel at 5, and jack mackerel at 1.

Two gravid female sardines containing free transparent eggs were taken at different locations at Santa Catalina Island. (Less than 40 California sardines have been observed in this condition.) These fish measured 181 mm. and 214 mm. The remainder of the samples consisted largely of males. The behavior of the schools containing the ripe fish was typical of many others attracted to the light. The schools were small--less than 1 ton--with the fish occasionally darting to and from the surface.



M/V *Alaska* Cruise 58-A-2 May 12-28, 1958

The *Alaska* scouted 372 miles during which 58 sardine schools were sighted. All but three were observed in the vicinity of Anacapa Island. A plankton tow through a school group in this area failed to produce evidence of spawning. Other pelagic fish school sightings included 6 anchovies, 4 Pacific mackerel, 2 saury, and 16 large unidentified tunalike fish.

The sardine samples consisted predominately of 2 distinct size groups with modes at 170 mm. and 200 mm. Nearly all females in the large size group were in an advanced stage of sexual maturity. The smaller group contained nearly all stages, ranging from immaturity to highly gravid.

Difficulty was experienced in attracting and capturing sardines. The fish were attracted with a 1,500-watt incandescent lamp and caught with snag gangs, baitless lures, and by gilling in the blanket net. Of the 100 fish collected, 43 were gilled in the blanket net, 36 were caught with hook and line and 21 with the blanket net. With one exception, schools sighted visually did not come to the light.

The blanket net did not operate effectively because most of the schools sounded immediately when the net was placed in the water. The best results were obtained by using it as a gill net. When

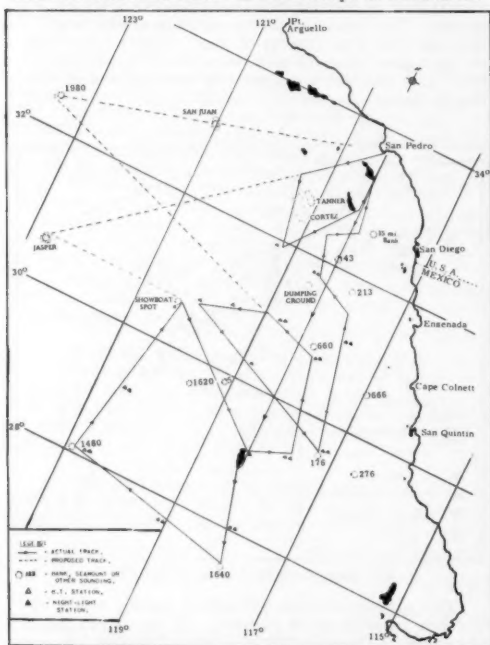
fish appeared under the light, the net was placed in the water and allowed to remain until fish gilled in the large webbing. Varying the light intensity seemed to have little effect on the number of fish gilled. Hook-and-line fishing with baitless lures yielded more fish but considerable time and effort were required to catch them.

Sea-surface temperatures ranged from 58° F. at San Diego to 66° F. at Santa Catalina Island. Temperatures were one to several degrees above normal to the north of Los Angeles and slightly below normal to the south. In the San Diego area a cooling of 8° F. from the previous month's temperature was noted. Sardines were taken in waters ranging from 60.6° F. to 64.8° F. The 2 ripe fish were taken in waters of 62.0° F. and 64.6° F. Bathythermograph and reversing thermometer casts were made on stations where depths were greater than 10 fathoms.

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**ALBACORE TUNA OCCURRENCE AND MIGRATION PATTERN STUDIED (M/V Alaska Cruise 58A3 - Albacore):** An exploratory survey prior to the commercial albacore fishing season was conducted by the M/V Alaska of the California Department of Fish and Game in an attempt to determine

250 miles off the coast of southern California and northern Baja California. Secondary objectives of the cruise were to tag and release albacore, and to gather pertinent biological and oceanographic data, which might be related to the occurrence of albacore.



M/V Alaska Cruise 58A3 - Albacore (June 9 to 29, 1958).

the occurrence and migration pattern of albacore schools as they approach the Pacific Coast. The cruise commenced on June 9 and ended on June 29 when the vessel returned to Los Angeles Harbor. The area survey covered the waters that lie 80 to

Approximately 1,700 nautical miles in the nearly 63,000-square-mile survey area were scouted during daylight hours using surface trolling gear. No incoming schools of albacore were located during the course of the survey, although commercial fishermen working inshore from the survey area, within 60 miles of the mainland shore were catching a few large (20- to 40-pound) fish.

Three attempts were made to scout areas farther north and west, i. e. San Juan Seamount to 123° W. longitude. Each time, inclement northwesterly weather conditions made visiting these areas imprudent. Commercial boats, from northern ports, heading for southern California were reported to be catching a few smaller (10- to 15-pound) fish shoreward of this proposed scouting area.

No tagging was accomplished on this cruise as no incoming schools of albacore were located.

Sea surface temperatures were observed and recorded at intervals of 15 to 60 minutes during daylight hours and continually graphed by recording thermometer. Warmest temperatures (up to 70° F.) were encountered in the southwest portion of the survey area; coolest temperatures (down to 62.6° F.) in the northern area from about Sixty-mile Bank toward Cortez Bank and San Clemente Island. Dirty green water characterized the cool surface temperatures to the north while clear, blue water prevailed over the remainder of the area surveyed.

Bathythermograph casts were made at the end of each day's run and additional casts were made when conditions warranted. cursory examination of the resulting slides indicated deepest thermoclines south and east of Guadalupe Island. The shallowest thermoclines were found at the more northerly stations; while the most distinct (sharpest) were at those stations farthest offshore.



A night light station, using a 1,500-watt bulb, was occupied each night that drifting conditions permitted. At nearly every light station, many of the usual albacore food components were collected. It seems unlikely that absence of albacore in the survey area could be attributed to lack of food organisms.

Apparently, no new schools of albacore entered the southern fishing grounds immediately north or south of Guadalupe Island during the month of June. The fish caught by commercial fishermen between San Benito Islands on the south and Todos Santos Island to the north were con-

sidered to be numbers of a small, "holdover" population from the preceding season.

The only indication of new schools of albacore moving into range of the California fleet comes from boats traveling to southern California from northern ports. Several of these fishermen caught scattered small fish north of Point Conception while running on a direct course.

It appears that this year's run of albacore will occur at latitudes farther to the north than has been characteristic of at least the past eight years.

\* \* \* \* \*

**AERIAL CENSUS OF COMMERCIAL AND SPORT FISHING OPERATIONS CONTINUED** (Airplane Spotting Flights 58-4, 58-6, and 58-7): These airplane flights by the California Department of Fish and Game's *Cesana 3632C* were designed to assess the numbers and distribution of clam diggers, abalone pickers, hook-and-line fishermen, and commercial salmon trollers, and to locate pelagic fish schools.

**Flight 58-4** (May 8-9, 1958): The inshore area between Pt. Sur, Monterey County, and the Russian River, including San Francisco, Bodega, Bolinas, and Tomales Bays was surveyed in the third of a series of flights.

Fog prevented scouting for pelagic fish on both days of this flight. The area from the Russian River to Fort Bragg could not be scouted because of fog and commercial salmon trollers could not be sighted farther offshore than about 4 miles. The fog, however, was not too low to prevent a survey of shoreline activity. A -0.8 tide on May 8 attracted abalone pickers to the rocky areas but the -0.2 low tide on May 9 was evidently not low enough for good abalone picking.

**ABALONE PICKERS:** On May 8 a total of 35 abalone pickers were sighted in the area between Pt. Sur and the Russian River; of these, 19 were observed near Pigeon Point, San Mateo County. On May 9, only 2 abalone pickers were observed--1 was a skin diver off Tomales Point.

**CLAMMERS:** The Pismo clam season closed on May 1, 1958, in Monterey Bay, and the only clambers sighted were those digging for mud clams in the bays and for cockles and little neck clams at Bolinas and Sharps Park.

Bay clambers were sighted on each day but in fewer numbers than on previous flights this year, despite the good low tide on May 8.

**HOOK-AND-LINE FISHERMEN:** Hook-and-line fishermen were comparable in numbers to that of previous flights this year with the largest concentration of shore fishermen at Baker's Beach and the largest number of pier fishermen at Berkeley Pier. In addition to the pier and shore fishermen, 24 skiffs were sighted on May 8--20 of these were in Monterey Bay where salmon were being caught. Due to limited visibility no skiffs were counted on May 9 in Monterey Bay.

**SALMON TROLLERS:** On May 8, 37 commercial salmon trollers were tallied in Monterey Bay

but limited visibility prevented sighting of commercial trollers to the north of Monterey Bay. (On Saturday, May 10, 14 commercial trollers off Pt. Reyes and 71 trollers between Bodega Bay and Fort Bragg were sighted from a commercial airline.)

**PELAGIC FISH CENSUS:** Pelagic fish schools could not be sighted because of the fog. Some scouting was attempted off San Francisco and in Monterey Bay but excessive glare on the water and fog patches close to the ground made scouting impractical.

**Flight 58-6** (May 22-23, 1958): The inshore area between Pt. Arguello and Bodega Bay, including Bodega, Bolinas, Drakes, and Tomales Bays was surveyed during the fourth of this series of flights.

On May 22 several rain squalls were encountered, and it was necessary to stop over at Watsonville airport for a period before proceeding south to Morro Bay. Fortunately, very little wind was encountered and a good survey for both shoreline activity and pelagic fish scouting was possible in the area from Moss Landing to Bodega Bay. On May 23 the rain squalls had passed but low fog prevented scouting for pelagic fish in the area to the south of Monterey Bay. It was possible, however, to scout the shoreline from Pt. Arguello to San Francisco.

**PELAGIC FISH CENSUS:** Schools of anchovies were observed in relatively large numbers as compared to past years in the area from Bodega south to Pigeon Pt. A total of 1,078 schools was observed in this area with the greatest concentrations appearing off San Francisco and in Half Moon Bay. Commercial salmon fishermen reported these anchovies to be small fish, probably of 1957- and 1958-year classes.

**COMMERCIAL SALMON TROLLERS:** A total of 134 trollers was sighted in the area between Moss Landing and Bodega Bay; of these, 127 were operating in the area from Drakes Bay to Bodega Bay.

**CLAMMERS AND ABALONE PICKERS:** A total of 21 bay clambers and 6 ocean clambers were tallied between Moss Landing and Bodega Bay. (The Pismo clam season closed on May 1 in Monterey Bay; hence, no tallies of Pismo clambers were expected to be made until the season reopened on September 1.) The ocean (outer beach) clambers

were sighted near Bolinas and San Francisco, and the bay clammers were sighted in Bodega, Tomales, and Drakes Bays.

**HOOK-AND-LINE FISHERMEN:** The beaches around San Francisco and Sharps Park continued to be the most favored surf-casting areas in Central California. About half of all the surf casters tallied on each day's flight were sighted in this area. The numbers of both surf and rock fishermen were very much the same as tallied previously.

**Flight 58-7 (May 26-27, 1958):** The inshore area between Monterey and Trinidad Head was surveyed on this flight, and excellent flying conditions prevailed on both days, making it possible to cover over 350 miles of coastline. The tide was not low enough for clammers and abalone pickers. Both pelagic fish and salmon trollers were scouted while flying one way along the coast and on return trips shore fishing activity was noted by flying at low altitude over the shoreline.

**PELAGIC FISH:** Large numbers of anchovy schools (over 4,500) were sighted on this flight. This represents more anchovy schools than have been seen on any flight made over the past four years in both California and Baja California waters. All the school groups encountered on this flight were a mixture of very small- to medium-size schools with a few large schools. The average fish school probably contained around 15-20 tons of fish.

The tally of these schools was made on the return trip from Trinidad Head south to Palo Alto and time did not permit intensive survey of each school group. Instead, one straight-line flight was made over each school group area, and all the schools visible on both sides of the plane were counted. Thus, schools passing directly under the plane and those beyond the visibility zone were not counted

and the numbers of schools given--especially those for the school group of Tomales Point to Point Reyes--are less than the actual number present at the surface.

Anchovy schools were also sighted in Monterey Bay during this flight. Future flights, however, will give a more representative estimate of the amount of fish present in this region of the coast because the water is still quite rich in phytoplankton which prevents sighting of fish schools unless they are very near the surface. Over the past four years fish schools have appeared at the surface in greater numbers from late June through November in Monterey Bay. Commercial fishermen and party-boat operators have reported large numbers of 5-inch anchovies in Monterey Bay, indicating most of the fish in this area are of the 1957-year class. Several sardines ranging from 135-161 mm. standard length were picked out of a haul of anchovies taken in Monterey Bay, but no pure schools of sardines were seen from the air or were reported by fishermen.

**COMMERCIAL SALMON TROLLERS:** The main concentrations of salmon trollers were adjacent to and sometimes within the school group area. In all cases the salmon trollers were in or at the seaward edge of the anchovy school group. A total of 255 salmon trollers was sighted. Over 170 of them were in the area from Pt. Reyes to Fort Ross.

**HOOK-AND-LINE FISHERMEN:** For the first time this year the area to the north of Fort Bragg was surveyed for sport fishermen, but few were seen in this northern area. Only 10 surf fishermen were sighted north of the Russian River, and 4 were surf-netters in quest of the daytime spawning silver smelt (*Hypomesus*).

From the Russian River to Monterey the favorite shore fishing areas continued to be on the beaches near San Francisco and in Monterey Bay.

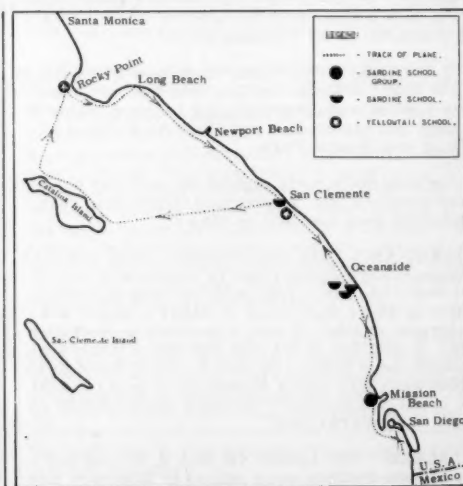
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#### PELAGIC FISH DISTRIBUTION AND ABUNDANCE OFF SOUTHERN CALIFORNIA OBSERVED BY AERIAL SCOUTING (Airplane Spotting Flight 58-5)

The mainland coast between Rocky Point (Santa Monica Bay) and San Diego; the ocean area between the city of San Clemente and the east end of Santa Catalina Island; the inshore waters along the northeast shore of Santa Catalina Island; and the ocean area between the west end of Santa Catalina Island and Rocky Point were scouted from the air on May 8, 1958, to study pelagic fish distribution and abundance off Southern California and to familiarize new personnel with aerial spotting techniques. The scouting was conducted by the California Department of Fish and Game with its Beechcraft plane.

Initially, 2 days were scheduled to scout the desired area but due to a heavy overcast, only 3½ hours during the afternoon of May 8, 1958, could be spent in the air. Even then, haze and generally poor visibility hampered the operation and resulted in an unsatisfactory flight.

No fish were sighted offshore or along the inner shoreline of Santa Catalina Island. Aside from a single, medium-size school of fish off Rocky Point,



Airplane Spotting Flight 58-5 of May 8, 1958.

Santa Monica Bay--tentatively identified as yellowtail--the only schools observed were along the mainland shore between San Clemente and Mission Beach.

One group of 10 small sardine schools was sighted off Mission Beach.

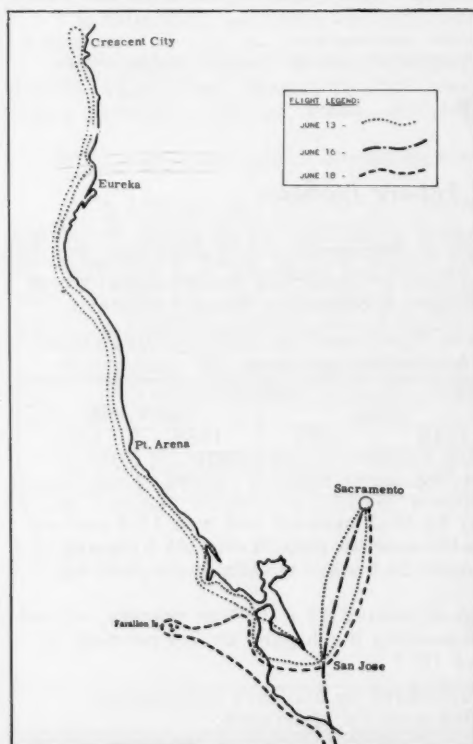
A large, fast-moving school of big fish--assumed to be yellowtail--was seen breaking the surface of the water just outside the kelp, off San Onofre. Individual fish in this school were easily distinguishable from an altitude of 1,500 feet; they were grey-brown in appearance and "flashed" frequently within the school.

\* \* \* \* \*

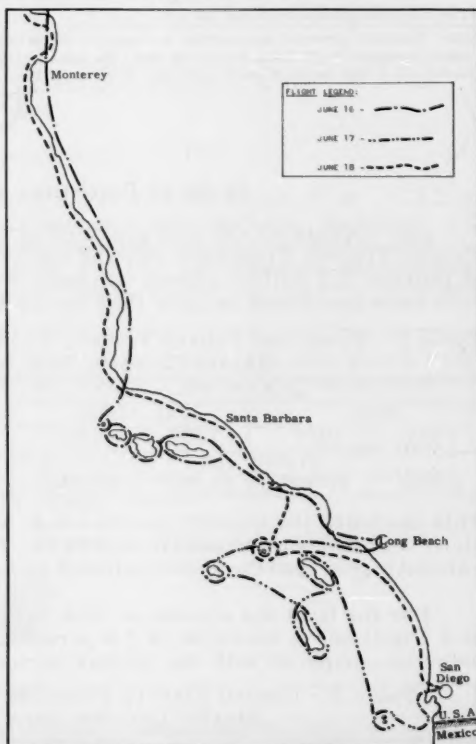
**CENSUS OF SEA LION POPULATIONS OFF COAST OF CALIFORNIA** (Airplane Spotting Flight 58-9): A census of the Stellar and California sea lion populations off California was conducted by the California Department of Fish and Game's Beechcraft plane from June 16-18, 1958.

The days selected for the sea lion census survey were in general good, insofar as atmospheric conditions were concerned; however, morning fog and local concentrations of fog of the Channel Islands limited observations mainly to the afternoon periods.

Significant or large concentrations of the animals were photographed on their rookeries and hauling-out grounds. The entire coast was covered with the exception of two small sections between San Mateo Pt. and Long Beach, and between



Airplane Spotting Flight 58-9 on sea lion census, June 13, 16, & 18.



Airplane Spotting Flight 58-9 on sea lion census, June 16, 17, & 18.

Santa Monica and Redondo where significant concentrations of sea lions have never been found in the past. Pictures were taken at elevations ranging between 500 and 1,500 feet. Strip-photographic methods were used for areas where the sea lion concentrations were spread out over relatively long lineal distances and single or overlapping photographs were taken of the smaller groups. Wherever possible, visual

estimates of the number of sea lions were also made. In those areas where small numbers of animals were present, visual counts only were made.

Visual estimates indicated that the Channel Islands, Santa Barbara Island in particular, appeared to have the greatest concentrations of sea lions. During past censuses the largest numbers were found at Ano Nuevo Island.

Note: Coverage of restricted offshore Southern California islands was made through cooperation of the United States Navy, 11th Naval District.



### Cans--Shipments for Fishery Products, January-May 1958



Total shipments of metal cans during January-May 1958 amounted to 37,143 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 54,426 tons in the same period a year ago. Canning of fishery products in January-May this year was confined largely to tuna. Holdover stocks of metal cans from the 1957 season, plus light packs of shrimp, mackerel, and sardines during the first five months of 1958 may account for the sharp

drop in shipments this year.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.



### Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-JUNE 1958: Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense 2.3 million pounds (value \$1.3 million) of fresh and frozen fishery products were purchased in June 1958 by the Military Subsistence Market Centers.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Market Centers, June 1958 with Comparisons

QUANTITY				VALUE			
June		Jan.-June		June		Jan.-June	
1958	1957	1958	1957	1958	1957	1958	1957
(1,000 Lbs.)				(\$1,000)			
2,285	2,023	11,595	12,025	1,306	1,039	6,600	6,145

This exceeded the quantity purchased in May by 11.2 percent and was 13.0 percent above the amount purchased in June 1957. The value of the purchases this June was 13.4 percent higher than the previous month and almost 26.0 more than in June a year ago.

For the first six months of 1958 purchases totaled 11.6 million pounds, valued at 6.6 million--a decrease of 3.6 percent in quantity but higher by 7.4 percent in value as compared with the similar period of 1957.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Market Centers, June 1958 with Comparisons

Product	QUANTITY				VALUE		
	June		Jan.-June		June	Jan.-June	
	1958	1957	1958	1957	1958	1958	1958
	(1,000 Lbs.)				(\$1,000)		
Tuna . . . .	513	263	1,713	1,450	250	890	
Salmon . .	73	-	1,400	992	44	768	
Sardine . .	9	13	42	86	3	15	

Prices paid for fresh and frozen fishery products by the Department of Defense in June 1958 averaged 57.2 cents a pound, about 0.9 cent a pound higher than the 56.1 cents paid in May and 5.8 cents above the 51.4 cents paid during June a year ago.

**Canned Fishery Products:** Tuna was the principal canned fish purchased for the use of the Armed Forces during June. The total quantity of canned tuna, salmon, and sardines purchased for the first six months (3.2 million pounds) was about 27.6 percent higher than the total for the comparable period of 1957.

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated, because it is not possible to obtain local purchases.



### Fisheries Loan Fund

**LOANS THROUGH JULY 14, 1958:** As of July 14, 1958, a total of 453 applications for fisheries loans totaling \$16,332,773 had been received. Of these, 244 (\$5,692,079) have been approved and 146 (\$4,484,535) have been turned down. As several applications have been deferred indefinitely at the request of the applicants and collections have been coming in, sufficient funds have been available to process all other applications received to date.

The following loans have been approved between May 14, 1958, and July 14, 1958:

**New England Area:** Willard-Daggett, Inc., Portland, Maine, \$70,000; Harold S. Chilles, Vinalhaven, Maine, \$1,100; Joseph Giacalone, Medford, Mass., \$22,000; Elmer Jacobsen, Marion, Mass., \$60,000.

**Middle Atlantic Area:** James Beebe, Islip, N. Y., \$7,722.

**South Atlantic and Gulf Area:** Simmons and Carrier, Southport, N. C., \$12,233; Thomas P. Duke, McClellansville, S. C., \$38,000; Porpoise Fish Co., Beaufort, S. C., \$24,509; John Clifford Smith, Charles City, Va., \$5,000; Herbert M. Sorter, Naples, Fla., \$27,758; Leo Angelette and Eugene Lafort, Cut Off, La., \$14,526; Herbert Galjour, Cut Off, La., \$12,385; Burke Collins and Alidore Bruce, Galiano, La., \$24,862; Robert J. Theriot, Houma, La., \$11,861.

**California:** M. Machado Medina, et al., San Diego, Calif., \$86,000; Zarco Fishing Co., San Diego, Calif., \$35,000; August John Felando, Jr., et al., San Pedro, Calif., \$73,000.

**Pacific Northwest Area:** Adolph Sandness, Bellingham, Wash., \$3,260; Eldon Roger Wills, Friday Harbor, Wash., \$5,669; Fishing Vessel Seattle, Port Blakely, Wash., \$10,850; Floyd D. Furfjord, Westport, Wash., \$6,000.

**Alaska:** Joseph E. Ott, Pelican, \$1,400; Howard E. White, Petersburg, \$25,000; Leo Lyster, Wrangell, \$14,500.



### Fish Meal

**RECENT CALIFORNIA MARKETING TRENDS:** The shortage of wet fish (sardines, mackerel, and anchovies) and the use of more dark or red meat from tuna for pet food have resulted in short supplies of California fish meal, and brokers in that State have stepped up importation of meal from foreign countries, according to a report from a Market News Reporter at San Pedro.

The chief port of entry in California for imported meal is San Francisco, and the imported meal comes mainly

California Fish Meal Imports

Country of Origin	Peru	Chile	Mexico	Norway	Total
..... (Million Pounds) .....					
1958 Jan.-May	15.7	4.3	1.0	0.1	21.1
1957 Jan.-May	11.2	-	0.5	-	11.7
1957 Total	12.7	0.6	0.8	0.3	14.4



from Peru, where it is produced from a small variety of the true anchovy (*Engraulis Ringens*). There are, at present, about 36 reduction plants in Peru engaged in the manufacture of fish meal and oil; half of these operating in conjunction with canneries. Other main sources of meal imported into California (in order of importance) are Chile, Mexico, and Norway.

The increase in imports of meal into California from foreign countries for the first four months of 1958 with



comparisons are shown in the table. The imports are expected to rise sharply if the shortage of California wet fish continues. In 1957, imports dropped sharply after the first half of the year because of good California mackerel production.

Imported fish meal prices are usually several dollars per ton less than domestic production; but, according to brokers, the mixer prefers domestic meal for several reasons: (1) imported meal is almost 100-percent burlap bagged; (2) quantities have to be bought in large lots rather than by delivered order; (3) the buyer must remove meal from the dock before the seven-day free period allowed by port authorities is up; and (4) poor weights per 100-pound sack that may vary 2 to 3 pounds either way. Additionally, the protein units are generally higher—about 65-70 percent as against California's 60 percent, so that when using imported meal, mixers claim extensive formula manipulation is necessary which adds to the expense of their operation. The reason for the greater protein content of foreign meal is that whole fish is used in the manufacture of meal while domestically waste or only the parts of the fish not canned or otherwise utilized are used. Lowering the protein content is difficult; water, oil, or bone meal has to be added which has to be obtained from some other source.

The demand for fish meal has greatly stepped up production in Peru and Chile, and no doubt has resulted in the expansion of facilities. If there is a return of California wet fish, as is expected, California-produced meal will have to meet increased competition.



## Florida

**FISHERIES RESEARCH:** Fisheries research conducted by the Marine Laboratory of the University of Miami with funds provided by the Florida State Board of Conservation, the U. S. Fish and Wildlife Service, and private sources as reported in the July 1958 Salt Water Fisheries Newsletter from that Laboratory.

**Shrimp Studies:** Since the shrimp fishery is Florida's most valuable single resource, a great deal of the research effort is being devoted to studying the various aspects of the life history of the shrimp which affect the yield of the commercial fishery. At present most of the studies have been concerned with the Tortugas fishery.

The tag being used at present consists of two green plastic discs attached by a pin that pierces the mid-section of the body. Information on size distribution by depth of water, growth, migrations, and fishing intensity is also being collected by monthly sampling trips on a chartered shrimp trawler. Many shrimp dealers have permitted the examination of historical records of catches. These suggest that the catch per unit of effort since 1950 has shown little change. These records have also provided a great deal of other useful and interesting data, such as annual and seasonal changes of abundance.

Another important part of the shrimp studies is the one being conducted by a student working on a fellowship provided by the Shrimp Association of the Americas on the spawning habits. Samples are being obtained monthly from the commercial fishery and the degree of maturity is being measured by different methods. Preliminary observations suggest that while spawning might take place throughout the year, the peak of spawning activity occurs in the spring and the fall.

**Scallop and Clam Studies:** Exploratory fishing studies with commercial gears have been initiated to determine the possibility of expansion of the commercial fisheries for these species. The scallop studies are being made in the Cedar Key area and the clam study in the waters of Collier County.

**Florida Bay Studies:** In association with the shrimp biology and tagging experiments in Florida Bay, other animals and plants and the water conditions are being studied there. This work can help the fishing industry by finding out the conditions required by the important species for survival, particularly in their early life. This information is especially important to Florida where so many changes are being made in the natural habitats through dredging, filling and other land development and

pollution activities. The Everglades National Park area was chosen for this work because it was considered to be fairly typical of Florida's inshore environment, it was an area where a wide variety of animals live and it has been subjected to few manmade changes. The effects of temperature, salinity, oxygen saturation, total sulphide production, turbidity and other chemical and physical factors on the marine life are being measured. The effects of the recent unseasonable weather is proving of particular interest.

**Spotted Sea Trout Studies:** The spotted sea trout in the Indian River area was studied last year. The trout in other parts of the state appear to differ in growth rate and in other ways from those in the Indian River. To investigate the reasons for the difference and because it is an important species to the area, spotted sea trout studies are now being done in the Apalachicola-St. Marks area. The factors being investigated include age and growth, spawning time, feeding habits, and the chemical and physical nature of the water in which the fish are living. Other species present in the area are also being collected and identified.

**Synthetic Crab Baits:** The crab industry in some parts of the State has recently experienced difficulties in obtaining fish in a large enough quantity and at a low enough price as bait for their crabbing operations. The possibility of developing a synthetic crab bait was suggested. If such a bait, attractive to crabs, yet of low cost could be developed it would be of benefit to the industry. Balsa wood, rubber, plastics, and gelatine have been impregnated with fish oils, blood, and other similar products under pressure. These have been tested in commercial crabbing operations along with regular baits. Preliminary results with balsa wood and menhaden oil are encouraging and the tests are continuing.

**Quality Control of Fish:** Two of the most important changes that occur in frozen fish are the development of rancidity and the loss of the characteristic color. Rancid or stale odors or flavors result when unsaturated fat in the fish is oxidized. The oxidation is slowed but not prevented by low temperature storage. Chemicals called antioxidants can be used to retard oxidation and hence the occurrence of rancidity. One chemical tested so far with encouraging results is butylated hydroxytoluene (BHT) in varying concentrations and in combination with other chemicals. Spanish mackerel, an oily fish, much subject to rancidity is being used in the present experiments.

The retention of the characteristic red color in red snapper is the object of another experiment. The antioxidant BHT, which is also proving its usefulness in combating rancidity, is helping to retain the color after prolonged storage. Other chemicals have also given encouraging results for this purpose.

Studies on the prevention of bacterial spoilage and black spot formation in shrimp have been under way for a few years and important discoveries have been made. Among the antibiotic chemicals tested, aureomycin and other

similar products have proved effective in retarding spoilage caused by bacteria. This year, other products, some of which are giving promising results, are being tested.

The use of these chemicals by the fishing industry awaits the approval of the Food and Drug Administration and the Marine Laboratory is playing its part in testing for any possible harmful side effects from their use. Studies on the types of bacteria which cause spoilage and on their tolerances of certain conditions are also being made by the Marine Laboratory technologists.



## Frozen Processed Fishery Products

**CONTRACT LET FOR STUDY OF INSTITUTIONAL CONSUMPTION:** A study of frozen processed fish and shellfish consumption in institutions and public eating places in 10 selected cities will begin shortly. A contract for \$57,000 was awarded in July by the Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, to Crossley, S-D Surveys, Inc., of New York City. The survey will be financed from funds provided by the Saltonstall-Kennedy Act to increase production and markets in the domestic fishing industry.

Since the mass feeding industry is among the best of all potential markets for frozen fishery products, the Bureau proposes to obtain information through this study which will benefit the fishing industry in finding ways to diversify and increase the use of fish and shellfish in these establishments.

The cities involved in the survey are Atlanta, Ga., Chicago, Ill., Cleveland, Ohio, Denver, Colo., Houston, Tex., Los Angeles, Calif., New York City, Omaha, Nebr., Portland, Oreg., and Springfield, Mass. They have been selected because they are fairly well distributed geographically and account for a good proportion of the consumption of frozen fish and shellfish by mass-feeding establishments.

"Mass-feeding" establishments include: (1) restaurants, cafeterias, and eating places in hotels, (2) eating places in schools, dormitories, industrial plants, and office buildings, (3) hospitals, prisons, and other similar public and private institutions, and (4) department stores or drug stores serving food, lunchrooms, etc.

The survey is scheduled for completion within 10 days.



## Groundfish

**BROAD ANALYSIS OF NEW ENGLAND GROUND FISH INDUSTRY PROBLEMS PLANNED:** A study to determine the underlying economic and technological factors which may dictate the long-term competitive status of the New England groundfish industry is being made by the U. S. Department of the Interior.

A contract to make this analysis has been awarded to Boston College by the Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service. The contract price is \$31,700. Boston College's Bureau of Business Research will conduct the study.

The work will necessarily involve collection and compilation of comparative cost data. However, the Bureau is asking that the study "go behind such cost data" and establish, by basic economic and sociological analysis, the reason for cost differentials. The Bureau wants to have explored the present and future alternative economic opportunities available to capital and labor, the degree of dependence of

the area upon the fishery, the growth of other industries and their demands upon investment capital and labor supply, and the effect of changes in social habits.

Among the factors which will be evaluated are the cost of production, and the availability of the groundfish resources; the labor market; living standards; management of capital in terms of types of vessels and equipment; primary marketing arrangements; and the role of governmental bodies in terms of capital grants, subsidies, price supports, research, and tariffs. The Bureau of Business Research of Boston College expects to assemble and evaluate available source material influencing the general economic and social trends and to compile cost of production data from published or unpublished material already available.

A secondary feature of the contract with Boston College is to make a limited evaluation of the sea scallop fishery in relation to its general economic background.



## Great Lakes Fishery Investigations

**LAKE SUPERIOR BIOLOGICAL RESEARCH PROGRAM, 1958:** The initiation of intensive sea lamprey control on Lake Superior by the Bureau of Commercial Fisheries makes it most important to study the abundance, distribution, and biology of fish inhabiting the lake. The presence of the lamprey influences nearly every species of fish to some degree. Species directly affected by the predator, and species of existing or potential commercial importance, require early consideration. Their abundance and availability will determine the success of the fishery during the periods of intensive lamprey control and lake trout rehabilitation. It is also necessary that environmental conditions be measured to aid in understanding changes in the fish populations that have occurred and may continue to take place.

Suggested objectives and approaches to the problems of Lake Superior have come from the several states and province surrounding Lake Superior through the Great Lakes Fishery Committee and from the Great Lakes Fishery Commission through its Scientific Advisory Committee.

The lake trout, lake herring, and whitefish have been the most important species in the United States



waters of Lake Superior, averaging over 98 percent of both the total catch and ex-vessel value over the last 10 years of record (1947-1956). The lake trout which contributed 18 percent of the poundage (2,642,000 pounds) and 55 percent of the value (\$1,087,000) over this period has been most seriously depleted by the lamprey. Maintenance of the fishery must now rely more heavily on species less affected by the lamprey or on stocks not now fully exploited.

Depletion of the lake trout population is reflected by the continuous decline in United States commer-

cial production from 3.2 million pounds in 1950 to a catch of 1.8 million pounds in 1956. The incidence of lake trout bearing lamprey scars increased from 3 to 27 percent over this same period while large fish became less frequent and spawning stocks greatly diminished--all symptoms of depletion resulting from lamprey predation that were demonstrated in Lakes Michigan and Huron. Current measures for controlling the sea lamprey should save the lake trout from the near extinction that occurred in Lake Michigan, but cannot halt the economic depression that is already upon the fishery.

The whitefish which contributed 6 percent of the United States poundage (880,000 pounds) and 18 percent of the value (\$358,000) of the total catch in 1947-56 has provided a supplemental source of income to the Lake Superior fishery. Preliminary evidence has shown that some local populations may not be cropped most efficiently under present fishery regulations and could be more useful in providing immediate relief for the industry. It has been demonstrated in other lakes, however, that the whitefish is subject to depletion by the lamprey following the extreme reduction of the lake trout stocks and consequently can be considered only of temporary value in lessening the distress of the fishery.

Although the lake herring has supplied 74 percent (11,219,000 pounds) of the total United States catch over the past 10 years of record (1947-1956), it has produced only 25 percent (\$503,000) of the total income of Lake Superior fishermen and vessel owners. The low value of this fishery has resulted in large measure from the seasonal nature of production and the resulting market glut--79 percent of the annual catch is taken during about 3 weeks in November or December. This very abundant species has been affected little by lamprey predation in other lakes. If the same holds true in Lake Superior, it may be of great value in providing continued support to the fishery. For use to maximum economic advantage, however, it must be cropped more evenly throughout the year.

Other abundant species not fully utilized by the fishery are the chubs (deep-water ciscoes), smelt, menominee whitefish, and suckers. Problems of distribution, abundance, fishing methods, effects

of increased production, and markets must be explored for these species to determine the contribution they could make to the fishing industry.

**Fishery-Limnological Surveys:** The research vessel *Siscowet* has been reconstructed so it can be used in lakewide operations in Lake Superior, and to handle various types of experimental fishing gear and limnological equipment. This boat will be a major tool in the 1958 field studies in gathering data on species composition, distribution, abundance, . . . of Lake Superior fish and on the environmental conditions under which the fish live.

Fishery and limnological surveys will, except for cruise 5, be concentrated in the area west of Ontonagon, Mich. These surveys will be designed to collect information on all species in the area and on general limnological conditions. Cruise 5 in the Isle Royale area will include collection of data on the abundance and distribution of lake trout, whitefish, lake herring, and other species of the area. Studies of lake herring emphasize the distribution and habits during summer.

In addition to work conducted from the *Siscowet*, inshore fishery and limnological studies will be carried on from a 16-foot boat powered with an outboard motor and equipped for trawling. Collections will also be made from the commercial fishery.

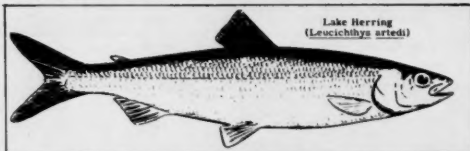
**Lake Trout Studies:** Studies of the lamprey-scarring rate and composition of the lake trout in the commercial catch will be continued. Records of returns of tagged and fin-clipped trout released in the lake in recent years will be accumulated as in the past. These operations will continue to be restricted, mainly to the Marquette area.

Studies of the abundance of immature lake trout will be intensified. This information is of vital importance in developing and maintaining an index of the status and changes in stocks of lake trout that are small enough to be partly free from lamprey predation. It was demonstrated in Lake Michigan that the commercial chub fishery can serve as a source of valuable data on the abundance of small trout. The success of the project in Lake Superior depends, however, on the submittal by the commercial fishermen of accurate records of lake trout catch in chub nets. An attempt will be made to obtain the data required for satisfactory estimates of the status and changes in the population of immature lake trout.

In some areas where the commercial fishery for chubs is nil or limited, the *Siscowet* may be used in special studies to obtain information on the lake trout population. Collections on regular cruises of the vessel will also be designed to obtain distributional and biological information not available from the commercial fishery.

**Lake Herring Studies:** Information on the distribution of lake herring during the summer is scanty. Greater knowledge of the summer habitat is of vital importance in gaining a better understanding of factors influencing the herring populations. Knowledge of summer distribution may permit the development of a fishery for this very abundant species throughout much of the year and thus make possible more orderly marketing at better prices.

The *Siscowet*'s even-numbered cruises will be spent in studies of the distribution and habits of the lake herring from early summer up to the spawning period. Sweeps will be made with a special fish-magnifying fathometer to learn where and at what level lake herring are found. When they have been located, experimental fishing gear of several types will be used to sample the herring to determine their com-



position, habits, and concentration. If herring schools are found near the surface in summer, flights will be made to determine if the schools can be spotted from an airplane and information on size, distribution, and frequency of schools will be gathered.

**Whitefish Studies:** Research initiated in 1957 to determine the growth characteristics, and age and size composition of the local whitefish populations



of Lake Superior will be continued. Much of this information will be collected from the fishery. Findings may permit recommendations for more efficient harvesting of the stocks. Additional information on the distribution, abundance, and biology of whitefish that have not entered the commercial fishery will be gathered in fishery and limnological surveys of the *Siscowet*. In fact, a primary objective of cruise 5 to the Isle Royale region will be to study the abundance and distribution of whitefish in that area.

**Other Species:** The fishery and limnological surveys of the *Siscowet* will be designed to obtain information on all species of fish. Particular emphasis, however, will be given to those species that may be of greater use in the commercial fishery—chubs, smelt, menominee whitefish, and suckers. All of these fish are in greater abundance, local or lakewide, than has been reflected in the commercial catch. It has been demonstrated at other times in Lake Superior or in other lakes that these species have a market potential not now realized in Lake Superior. Information on the distribution and abundance of species in this group will be gathered to produce data needed to evaluate their potential contribution. Where possible, additional knowledge will be accumulated on other less abundant yet locally-important species such as northern pike, yellow pike (walleye), yellow perch, sauger, and carp, and on forage fish serving as food of piscivorous species.

**Environmental Studies:** Some general limnological features of Lake Superior were brought out by the work of the U. S. Bureau of Commercial



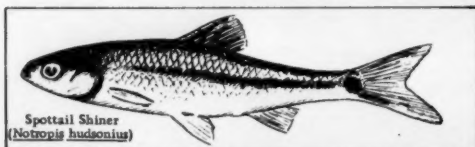
Fisheries research vessel *Cisco* in 1952 and 1953, and in other studies. Due to its size, depth and low content of organic and inorganic constituents, this lake presents some special problems of measurement, analysis, and interpretation. Some studies during fishery and limnological cruises of the *Siscowet* will be directed toward refining these procedures and techniques. Preliminary work will be done to establish long term "environmental-index"

Note: Common and scientific names of fish mentioned: Carp, *Cyprinus carpio*; chubs (deep-water ciscoes), *Leucichthys* spp.; lake herring, *Leucichthys artedii*; lake trout, *Salvelinus namaycush*; menominee (round) whitefish, *Coregonus cylindricus*; northern pike, *Esox lucius*; sauger, *Stizostedion canadense*; smelt, *Osmerus mordax*; suckers, *Catostomus* spp.; yellow pike or yellow pike-perch (walleye), *Stizostedion vitreum vitreum*; whitefish, *Coregonus clupeaformis*; yellow perch, *Perca flavescens*.

\* \* \* \* \*

**WESTERN LAKE SUPERIOR HERRING AND GENERAL FISHERY SURVEY (M/V Siscowet):** The M/V *Siscowet* was recently converted from a Great Lakes gill-net tug to a fishery and hydrographic research vessel for the U. S. Bureau of Commercial Fisheries Great Lakes Fishery Investigations in Lake Superior. The vessel is powered by a 147-horsepower Diesel engine, is 53 feet long, with a 15-foot beam and 6-foot draft, and weighs 43 tons. The *Siscowet* has sleeping accommodations for 5 people, a galley, and laboratory facilities, and is equipped with trawling and hydrographic winches, a gill-net lifter, a fish-finder fathometer, radar, radio-direction finder, automatic pilot, and radio-telephone. The vessel's cruising speed is 10 miles per hour and its cruising radius exceeds 1,100 miles.

**Cruise 1 (June 3-11):** A fishery and environmental study of western Lake Superior was initiated during Cruise 1 (June 3-11, 1958) of the *Siscowet*. Three index stations were established for measuring species composition, abundance of fish, and recording environmental conditions. These stations are located (1) north of Little Girls Point, Mich., (2) southeast Stockton Island, and (3) northeast of Bear Island (two of the Apostle Islands, Wis.). Fish were collected with gill nets and trawls at



each station, and samples were taken for studies of plankton, bottom fauna, and water chemistry. Bathymograph casts were made at and between stations. These stations will be visited periodically to determine the seasonal and annual changes that may occur.

Trawl catches at all stations were light. The slimy muddler and ninespine stickleback dominated in most catches. Other species taken were



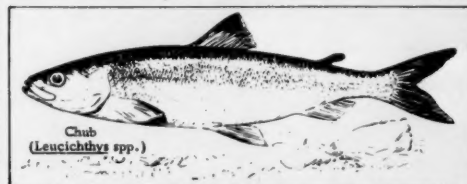
trout-perch, smelt, pigmy whitefish, burbot, and chubs. Only two lake trout were taken in trawl tows.

stations for measurement of trends in lake characteristics.

During all cruises of the *Siscowet* and in other studies, limnological data will be collected to establish the environmental preferences and requirements of the various species of fish. These data will be used wherever possible to interpret the distributional and biological traits of the species.

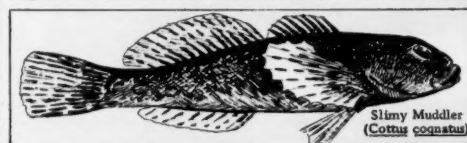
Gill-net catches were somewhat better with chubs dominating catches in depths of 22-35 fathoms. Longnose suckers and menominee whitefish were the best represented species in nets fished in depths of 1-17 fathoms.

Although inshore areas had some temperature drop between the surface and bottom, no well defined thermocline had developed. Surface temper-

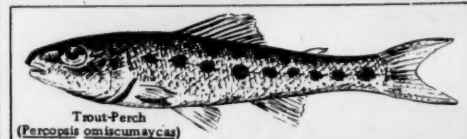


atures remained close to 45° F. (7.2° C.) and bottom temperatures 40° F. (4.4° C.) in the area covered. Open lake areas were homothermous.

**Cruise 2 (June 23-July 11):** Was devoted to gathering data on the summer distribution of the lake herring



in Western Lake Superior. Four sampling stations were established (1) northwest of Sand Island, (2) northwest of Rocky Island, (3) west of South Twin Island, and (4) north of Outer Island, all in the Apostle Islands, Wis. Bull nets (gill nets 300 feet long and 25



feet deep) with mesh sizes of 2½ and 2¾ inch were set at each station at various depths below the surface. These sets will be repeated at these stations throughout the season to follow changes in distribution of herring. These nets may also be set in other areas of the lake if required to gather additional data or to follow movements of herring.

Water temperatures were recorded and plankton and bottom samples collected at each station. Plankton samples were collected repeatedly throughout the



night at one station to detect possible changes in vertical distribution. With the exception of one set, all nets were anchored. Other nets were floated at depths of 6, 26, 46, and 66 feet below the surface. The depth of the water among the 4 stations ranged from 25 to 240 feet. At one station the nets were set at 5 and 26 feet below the surface in water 60-240 feet deep, and drifted throughout the night using the boat as a drift to pull the nets along. These nets measured 1,500 feet and drifted about 4 miles before being lifted. Where possible, trawl tows were made at each station concurrent with gill-net sets.

Catches in the trawl were predominantly nine-spine sticklebacks and the slimy muddler. Species less common in the trawl catches were chubs (hoyi and kiyl), smelt, and longnose suckers. In



many cases bottom conditions did not permit trawling.

Lake herring were taken in a

bundance only at the station northwest of Sand Island where the water was 180 feet deep. Bull nets set with cork lines 6 and 26 feet below the surface took 269 herring ranging from 9-14 inches long. In this set no herring were caught in depths above about 16 feet. The following night nets were set at this same location with cork lines 26, 46, and 66 feet below the surface and 40 herring were taken. Less common species taken in the bull nets were chubs (hoyi and kiyl), smelt, and lake trout. Sets in shallow water (20-25 feet) predominately caught menominee whitefish, longnose suckers, and burbot, and very few herring. The drifting set, which drifted in water from 60-240 feet deep, caught 32 herring ranging from 14 to 16.5 inches in length.

Although the weather on Lake Superior has been unseasonably cold and windy, the water north of Outer Island was becoming thermally stratified. Surface temperatures varied from 47° to 51° F. (8° to 11° C.) with a definite thermocline occurring between 50 and 100 feet, below which the temperature was about 40° F. (4° C.)

Note: Common names for chubs vary throughout the Great Lakes and sometimes the same name may apply to different species in different lakes. Therefore the various species of chubs are designated by their specific name to avoid confusion.

\* \* \* \* \*

**SURVEY OF WESTERN LAKE ERIE FISH POPULATIONS CONTINUED (M/V CISCO Cruise 6):** In spite of delays due to engine repairs, the U. S. Bureau of Commercial Fisheries research vessel Cisco visited all 10 of its regular trawling stations in western Lake Erie during the July 9-21, 1958, cruise. Limited trawling was also done in Sandusky Bay. The most striking feature of the catches was the almost complete lack of smelt (other than fry), as contrasted with the large catches of cruise 5. Smelt fry were common everywhere, but larger smelt were numerous only north of Pelee Island. Apparently most of the larger smelt have moved into the cooler waters of the central and eastern basins.

Yellow perch predominated in most of the catches. Several of the yellow perch bore small, fresh lamprey scars, and one silver lamprey (*Ichthyomyzon unicuspis*) was taken in a catch which contained one of these scarred fish. The presence of large numbers of yellow perch fry in many areas suggests the possibility of a highly successful 1958 hatch. Other species taken in abundance were sheepshead, emerald shiners, spot-tail shiners, and trout-perch.

Some sheepshead had still not spawned, but most of the smaller mature ones were spent. A few

sheepshead fry were caught. The sheepshead spawning season appears to extend over a longer period of time than for most other species. Trout-perch had, with an occasional exception, completed spawning, and a few fry of this species were also taken. Most spot-tail shiners had spawned, but emerald shiners had not begun.

The following species were taken in small numbers: yellow pike (walleye), burbot, channel catfish, brown bullhead, stoner cat, logperch, sand darter, carp, goldfish, white sucker, silver chub, white bass, smallmouth bass, white crappie, alewife, gizzard shad, and mooneye. The latter four species were taken only in Sandusky Bay.

Surface water temperatures were appreciably warmer than during the previous cruise, ranging mostly from 22° to 24° C. (71.6° to 75.2° F.). Extremes were 20.8° and 26.1° C. (69.4° and 79.0° F.). There was no well-marked thermal stratification in the western basin, but east of Sandusky, barely in the central basin, a thermocline existed at about 6-fathoms depth. Oxygen was quite scarce below the thermocline with concentrations as low as 1.6 parts per million recorded. Catches were very small in the area of lowest oxygen concentration.

Note: See Commercial Fisheries Review, July 1958, p. 29, for scientific names of fish mentioned in this and the previous article.



## Gulf Exploratory Fishery Program

**GULF OF MEXICO EXPLORED FOR HARD CLAMS AND SCALLOPS (M/V Silver Bay Cruise 10):** Explorations to assess the hard clam and scallop resources in the Gulf of Mexico on the continental shelf along the coasts of Florida, Alabama, and Mississippi were conducted by the exploratory fishing vessel M/V Silver Bay of the U. S. Bureau of Commercial Fisheries during a cruise which began

on July 17 and ended on August 4, when the vessel returned to Pascagoula, Miss.

A total of 202 stations were made between Cape Romano, Fla., and Chandeleur Island, Miss., in depths ranging from 16 to 120 feet.

Sixty-nine tows were made between Cape Romano, Fla., and Anclote Keys with two 12-tooth "Fall

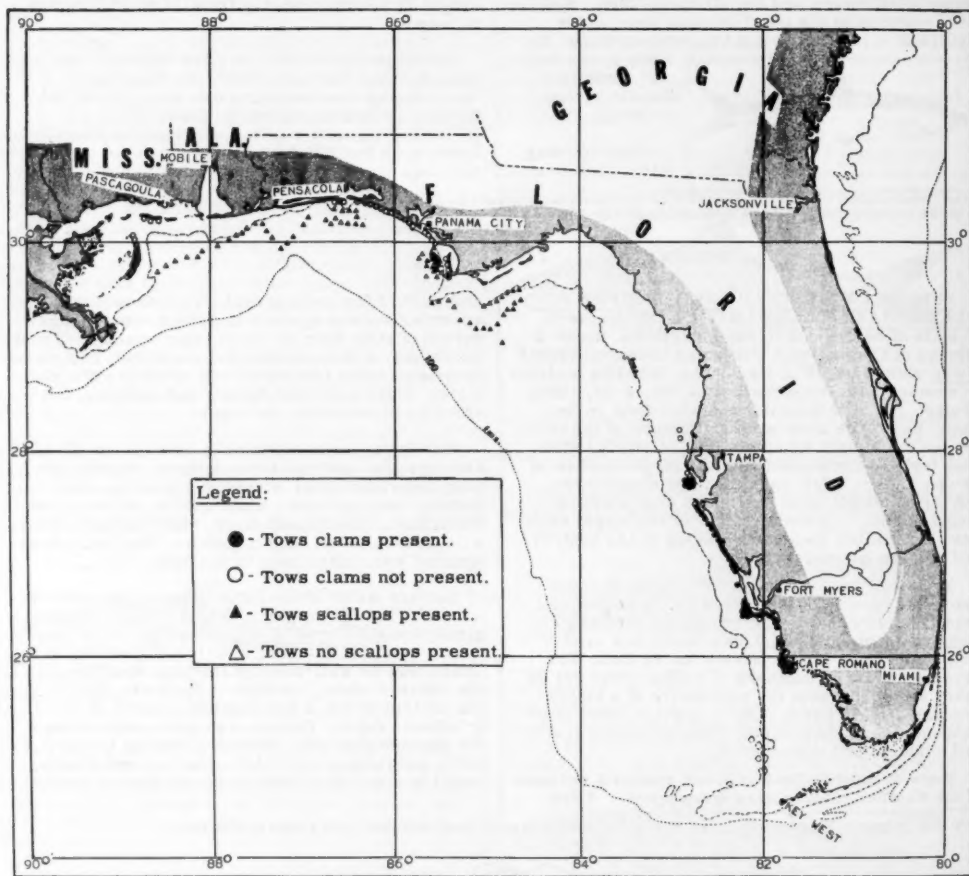
River" type hard-clam dredges. Hard clams (*Venus* sp.) were taken in all tows in this area where bottom conditions were suitable to the gear, with best fishing confined to the areas off Pass-a-Grille Beach, Venice, Fla., and Marco Island. The catch in these areas in depths from 16 to 22 feet (the vessel's deep draft, 13 feet, precluded any attempt to explore inside the 16-foot curve) varied from a few clams to a 1.5 bushels per 15-minute tow. One 5-minute tow slightly north of Venice with one dredge fishing produced a bushel of hard-shell clams. The clams range in size from 2" to 4½" with the bulk of the catch (75 percent) made up of 3" clams. Yield was approximately one gallon of meats per bushel

The clams were held in a wooden tank in which sea water was circulated continuously and were kept alive for 15 days with negligible loss.

Forty-six tows with the clam dredges between Cape San Blas and Horn Island in the 20-foot depth range failed to produce any hard clams.

The results obtained from this phase of the cruise suggest that the use of modern hydraulic dredging techniques will be required to fully evaluate the hard-clam potential of the Gulf of Mexico.

Eighty-seven tows were made with an 8-foot "Georges Bank" type sea scallop dredge south and



M/V *Silver Bay* Cruise No. 10 (July 17 to Aug. 3, 1958).

Though clams were taken in practically all tows west of Marco Island, considerable difficulty was experienced in this area due to the abundance of parchment worms on the bottom which clogged the teeth of the dredge, greatly reducing their efficiency. Hard sand and coral fragments also affected the efficiency of the dredges in many areas. This was partly overcome by substituting nylon line for towing warp in place of steel cable.

west of Appalachi Bay in depths of 5 to 20 fathoms in an attempt to delineate the grounds presently being fished for Gulf scallops (*Pecten gibbus*) and to discover and define any new scallop beds in the area.

The heaviest concentration of scallops presently fished here was found approximately 5 miles SSW. of St. Joseph Point, Fla., in 11 fathoms of water. Catches of 40 bushels per 15-minute tow were common in this area. Production fell off

considerably both shoaler and deeper than 11 fathoms; however, larger scallops (average  $2\frac{1}{4}$ "") were present in the deeper water. The main bed appears to run for 10 miles in a northerly direction to a point south of Panama City. These scallops averaged approximately  $2\frac{1}{4}$ " in diameter and yielded approximately 2 quarts of meats per bushel. Texture and taste are comparable to the northern bay scallop.

Exploratory tows in an area approximately 20 miles ESE. of Cape St. George resulted in the discovery of an extensive bed of smaller Gulf scallops (av-

erage 1") in depths ranging from 10 to 15 fathoms. Production in this area ranged from 1 to 40 bushels per 30-minute tow. Another less extensive bed of small scallops ( $\frac{1}{2}$ " to 1" diameter) was found midway between Mobile and Pensacola in 10 to 15 fathoms.

Two-inch metal rings and connectors originally were used throughout the chain bags on both types of gear. However, as escapement of both clams and scallops was found to be excessive with this size ring and connector, a 2-inch stretched mesh line was used on all dredges.



## Maine Sardines

**CANNED STOCKS, JULY 1, 1958:** Distributors' stocks of Maine sardines totaled 184,000 actual cases on July 1, 1958--26,000 cases or 13 percent less than the 212,000 cases on hand July 1, 1957. Stocks held by distributors on June 1, 1958, amounted to 237,000 cases, and on January 1, 1958, totaled 230,000 cases, according to estimates made by the U. S. Bureau of the Census.

Canners' stocks on July 1, 1958, totaled 386,000 standard cases (100  $\frac{3}{4}$ -oz. cans), a decrease of 509,000 cases (57 percent) as compared with July 1, 1957, and a decrease of 65.3 percent (725,000 cases) from the 1,111,000 cases on hand January 1, 1958.

Table 1 - Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks July 1, 1958, with Comparisons

Type	Unit	1957/58 Season					1956/57 Season			
		7/1/58	6/1/58	4/1/58	1/1/58	11/1/57	7/1/57	6/1/57	4/1/57	1/1/57
Distributors	1,000 Actual Cases	184	237	293	230	298	212	230	295	347
Canners	1,000 Std. Cases $\frac{1}{4}$	386	235	476	1,111	1,337	895	416	465	879

1/ 100  $\frac{3}{4}$ -oz. cans equal one standard case.

The 1958 pack from the season which opened on April 15, 1958, to July 26, 1958, amounted to about 848,000 standard cases as compared with 1,216,000 cases packed in the similar period of 1957. The pack for the 1957 season totaled 2,117,151 standard cases.

For the 1957/58 season there was an available supply of 2,543,000 actual cases (426,000 cases carried over from the previous season plus the 2,117,000 cases packed during the season).



## Marketing

**EDIBLE FISHERY PRODUCTS MARKETING PROSPECTS, SUMMER-FALL 1958:** United States civilian consumption of edible fishery products per person during the summer and early fall may be a little under the year-earlier rate. With the population larger this year and supplies of processed fishery products likely to be down some, retail prices probably will at least equal the high level of a year earlier.

The total commercial catch of fish and shellfish usually begins to increase in early spring and reaches a peak at about midyear. This year the rise has been less than usual because of the cold, late spring and scarcity of fish and shellfish in the established commercial fishing areas. Unless the commercial catch this summer and early fall is especially large, the seasonal build-up in stocks of processed items will undoubtedly be lower than in recent years.

Imports of canned and frozen fish and shellfish, which are an important supplement to domestic production, may be no larger than a year earlier.

Through late spring, total supplies of edible fish and shellfish were a little lower than in the same part of 1957. Commercial landings were down somewhat, with the slight increase for the species marketed in fresh or frozen forms more than offset by the reduction for those used mainly in canning. As of early spring, imports of fresh and frozen tuna for canning were noticeably lower than a year earlier. Imports of frozen groundfish and ocean perch fillets through the end of May about equalled the year-ago level. Domestic stocks of processed fishery products were down, reflecting reduced levels of production and imports, and the continued relatively strong demand for these products.

This analysis appeared in a report prepared by the Agricultural Marketing Service, U. S. Department of Agriculture, in cooperation with the Bureau of Commercial Fish-

eries, U. S. Department of the Interior, and published in the former agency's July 29, 1958, release of The National Food Situation (NFS-85).



## Maryland

COMMERCIAL FISHERY LANDINGS AT OCEAN CITY, 1957: Commercial fish and shellfish landings at Ocean City, Md., showed apparent declines of 7 percent in quantity and 9 percent in ex-vessel value in 1957 totals as compared to 1956, according to the May-June 1958 Maryland Tidewater News of the Maryland Department of Research and Education. These fluctuations appear to be normal for the



Atlantic otter trawl.

ocean fisheries and the totals approximate the 13-year mean weight and value (base years 1944-1956). The 1957 statistics, as in past years, were compiled by the Maryland Department of Research and Education at Solomons from the records of licensed commercial fishermen and cooperative dealers.

The catch (both quantity and value) of butterfish, croaker, sea bass, sturgeon, gray sea trout, and surf clams reflected this general decline. Contrary to

this, the totals for bluefish, fluke, scup (porgy), spot, whiting, industrial fish, and conch rose during 1957. Spot showed the greatest increase for an edible fish species, when the catch rose to 2.5 times the 1956 catch. The croaker catch for the year dropped to one-half that of 1956.

Two changes in marketing have affected the fishery. One change, that of lower demand, caused a decline in surf-clam fishing effort and catch. This decrease in fishing effort and the resulting lower catch were due to internal changes of the industry, rather than to any depletion of surf-clam beds. The evidence indicated that the surf-clam beds can support the same amount of fishing as practiced since 1953, because trip catches were maintained at high levels by the active dredgers. Nevertheless, the 1957 total catch and ex-vessel value amounted to approximately three-fourths of the 1956 totals. The surf clam, which each year since 1953, except for 1955, had ranked first in ex-vessel value of all fish and shellfish landed at Ocean City, dropped to second place in 1957, below fluke. From 1953 through 1956, the surf clam accounted for 40 percent of the annual value of the Maryland ocean fisheries. In 1957 the surf-clam value dropped to 33½ percent of the grand total.

The second change in marketing involved the industrial fish catch. Included in this classification are kinds of fish not generally used for human consumption, some examples of which are skates, sea robins, menhaden, and anglerfish. Traditionally, the ocean fishermen return such fish to the water, as they have been considered worthless. During recent years, however, a processor at Bishopville has begun to process industrial fish and scrap for chicken feed. Several trawlers from Ocean City have started supplying industrial fish to this processor. These trawler captains contend that since the non-commercial species have to be handled, they would prefer to get something for their trouble. One captain maintains that this catch pays his fuel bill each day. From these trawlers the 1957 catch of industrial fish



amounted to over 5 times that of 1956, while the 1957 value was over 12 times that of 1956.

Department biologists feel that the market for industrial fish can probably be expanded greatly at Ocean City. Possibly with a great expansion, facilities for processing would have to be located near Ocean City itself. A plant at Ocean City should result in higher prices to the fishermen since transportation costs of raw fish would be reduced. Other fishermen may consider handling this product at 80 cents or \$1.00 per 100 pounds against the 50 cents they can now expect.



### National Fisheries Institute

**CONSERVATION POLICY RESOLUTION ADOPTED AT 13th ANNUAL CONVENTION:** Among several resolutions adopted at the National Fisheries Institute 13th Annual Convention held in San Francisco, April 19-23, 1958, was the following which is of considerable interest to the fishery and allied industries.

**Resolution No. One - Policy on The Conservation of Natural Resources:** "WHEREAS, the effective conservation of natural resources is essential for the well being of the commercial fishing industry; and

"WHEREAS, the demands of the Nation's growing population on natural resources have resulted in tremendous competition for water and associated land resources among the various segments of our economy, threatening the destruction of the quality and the reduction in quantity of much of the waters and lands needed as habitats for fishery resources, and closely related wildlife resources; and

"WHEREAS, the wise use and conservation of water and soil is a 'must' if fishery resources and wildlife resources are to survive to support the commercial and recreational industries which depend on those resources; and

"WHEREAS, the National Fisheries Institute, as representative of the Nation's commercial fisheries industry, is

desirous of associating itself with other groups who have similar conservation objectives;

"NOW, THEREFORE, BE IT RESOLVED by the NATIONAL FISHERIES INSTITUTE at its 13th Annual Convention in San Francisco, California, on April 23, 1958, that:

- "(1) The policy of the National Fisheries Institute is to do everything it can to foster the conservation and wise use of the natural resources of the United States, particularly the fishery resource itself, and the water and related land needed to support the fishery resource and the wildlife resource of the Nation; and
- "(2) The National Fisheries Institute declares the harmony of its conservation objectives with those of other similar organizations who are working to advance sound conservation of water and land with the objective, among others, of preserving and improving habitat for the fish and wildlife resources of the United States; and
- "(3) The Institute desires to cooperate with other organizations in the development and support of conservation legislation and conservation programs at both the National and State levels which are in accord with this conservation policy statement."



### North Atlantic Fisheries Exploration and Gear Research

**HARD-SHELL AND SURF CLAM EXPLORATION BY M/V "SUNAPEE:"** The M/V *Sunapee*, under charter to the U. S. Bureau of Commercial Fisheries, began operations on June 2, 1958, to conduct a survey of Nantucket Sound and adjacent waters for the purpose of evaluating the commercial potential of hard-shell and surf clams, as recommended by the Atlantic States Marine Fisheries Commission.

The first month of exploration was hampered by unusually bad weather, limiting operations to 68 tows in the Nantucket Sound area; only 5 tows showed commercial concentrations. There were 4 tows of one-hour duration made 1½ miles SE. ¾ S. from Tuckernuck Shoal Buoy in 36-41 feet of water on a mixture of mud and sand. These 4 tows yielded an average catch of 7-8 bushels (85 pounds shell to the bushel) of hard clams (*Venus mercenaria*) with a meat yield of about 8.5 pounds per bushel.

The other area having a significant commercial concentration was located 1½ miles SW. and S. from Great Point, Nantucket Island, in 41 feet of water. The bottom was a mixture of mud, sand, and slipper shell. In a 20-minute tow, 11 bushels of hard-shell clams were dredged. The remainder of the area surveyed showed nothing of commercial value. The Great Point area, which showed the best yields, lies within the boundaries governed by the Town of Nantucket. There have been no



indications of new spat being set in the area, and determinations, so far, showed that the hard-shell clams taken to date are from the 15-20 year-class.

Observations made of the gear showed that winds of over 15-18 miles and strong tides affect the dredging unfavorably, making it impossible to fish under those conditions. It was planned to continue exploration through August, and it was expected that with better weather, the number of stations occupied during July would be increased.

\* \* \* \* \*

**HARD-SHELL AND SURF CLAM EXPLORATIONS CONTINUED (M/V Sunapee):** The Nantucket Sound phase of a jet-dredging survey for hard clams (*Venus mercenaria*) was completed on August 1, 1958, by the U. S. Bureau of Commercial Fisheries chartered vessel Sunapee. The survey was conducted on a grid basis by locating stations one mile apart on an east-west line and one-half mile on a north-south line. There were two phases of the survey.

The first phase was conducted during July south of 41°25' N. latitude, bounded by Nantucket Island on the east and Cape Poge, Martha's Vineyard, on the west. A total of 86 stations were completed in this area with only 6 having indications of commercial value. Of these 6 stations, one was northeast of Edgartown with a depth of 36 feet on a mixture of mud and sand; four were 1½-2 miles to the south and east of Tuckernuck Shoal Buoy on a mixture of mud and sand; and the other one was 2 miles SSW. from Great Point, in 41 feet of water on a brown sand bottom. The Great Point and Edgartown tows were within the township areas. A total of 76 bushels of hard clams were taken in these areas. Meat-yield tests showed 50 pounds of shell to 4 pounds 14 ounces of meat to be the average for the area. Surface water temperatures showed a high of 67° F. and a low of 62° F. Tests were made for clams of smaller than commercial size, without success.

During the second phase, a total of 300 stations were covered of which 107 could not be fished due to rough bottom conditions. Operations were conducted in the area bounded by 70°04' W. - 70°38'38" W. longitude and 41°25' N. - 41°31'38" N. latitude. The entire channel from Vineyard Sound to Pollock Rip was found to be unfit for jet-dredging operations because of strong tides, rocks, and sand ridges. The bottom from Bishops and Clerks, west to Wreck Shoal Buoy 16, was found to be composed primarily of sand and rocks. The Suconesset area to Nobska Point was also rocky. From Horseshoe Shoal on the east, including L'Hommedieu Shoal, to Bell Buoy 18 on the west, strong tides, rocks, and sand ridges made this area also unfit for fishing. Where it was possible to tow, no indications of hard clams were found.

The only area that showed a commercial potential during operations of the second phase, was 1½ miles NNW., 4 miles NNE., and 3 miles ENE. from Half Moon Shoal buoy on a bottom of mud and sand in depths of 31-50 feet of water. Meat-yield tests, conducted from several stations, showed 40 pounds of shell to 6½ pounds of meat. Small clams were sought, but, as in the other area, none were found. According to all indications, the hard clams caught were from the same set of a few years ago.

The survey will continue on August 4, 1958, in the area south of Martha's Vineyard and Nantucket Island. The purpose will be to explore this area for concentrations of surf clams and to evaluate their commercial potential. A final progress report, covering this phase of the project, will be published after the completion of the Sunapee charter on August 30, 1958.

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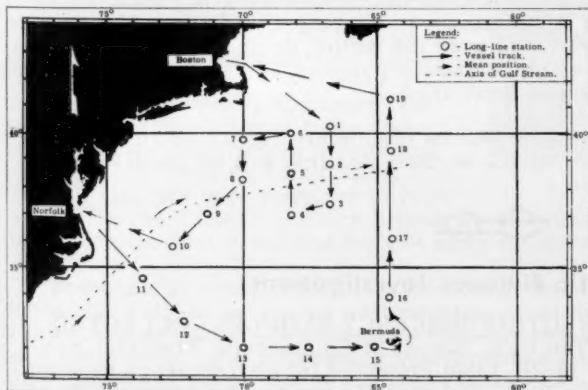
**TUNA FISHING EXPLORATIONS CONTINUED IN WESTERN NORTH ATLANTIC** (M/V Delaware Cruises 58-3 and 58-4): Significant concentrations of yellowfin tuna (*Thunnus albacares*) and big-eyed tuna (*Thunnus obesus*) were found during the second tuna long-line exploratory cruise of the 1958 season made by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware, July 8-August 4. The cruise covered 19 stations in an area ranging from south and east of Georges Bank, west to off the coast of Virginia and east to the Bermuda area.

As in previous cruises, the most productive area was south of Georges Bank. Three of the stations in this area produced by weight, 65.2 percent of all yellowfin tuna and 41.8 percent of the total quantity of fish landed during this cruise. Two of the stations were located north of the mean axis of the Gulf Stream and the other station was located to the south. The surface water temperature was 75.0°-79.5° F. Yellowfin tuna were taken at all of the 19 stations, except that for 5 stations the surface water temperatures were 70.5°-83.0° F. The largest numbers of fish occurred in temperatures between 75.0° F. and 79.5° F.



The Bureau of Commercial Fisheries exploratory fishing vessel Delaware.

All of the bluefin tuna (*Thunnus thynnus*) caught on this cruise were taken at 2 stations. Both of these stations were located south of Georges Bank along the 1,000-fathom line. Surface water temperatures were 60.0° F. and 64.0° F., respectively. The presence of bluefin in this temperature range closely agrees with the findings of previous cruises. The aggregate weight of bluefin was 1,030 pounds, a small amount in contrast to the large quantities previously taken at the same locations during other months of the year. This may be due to the inshore movement of bluefin tuna during this season.



M/V Delaware cruise 58-3 (July 8-August 4, 1958).

The first blackfin tuna (*Thunnus atlanticus*) caught during the North Atlantic offshore explorations was at a station located ESE. of Cape Hatteras. A second specimen was found in the stomach of a large blue marlin taken at the same station. The surface water temperature was 83.0° F.

The same stations that yielded bluefin also produced 2,950 pounds of big-eyed tuna. This is a heavier concentration than previously encountered and may represent the vanguard of the big-eyed population during the seasonal movement.

At 7 stations, 15 albacore tuna (Thunnus alalunga), having an aggregate weight of 750 pounds, were taken as singles except for 3 stations which yielded 4, 5, and 2 fish respectively. The surface water temperatures at these three stations were 76.5° F., 64.0° F., and 74.0° F., respectively. The temperatures, at the other four stations were all below 77.0° F. and above 69.0° F., except for 1 station which had a temperature of 83.0° F.

Incidental species taken during the long-line operations consisted of 7 blue marlin (Makaira ampla) 17 white marlin (Makaira albida), 19 blue sharks (Prionace glauca), 6 white tip sharks (Pterolaminopa longimanus), 16 lancetfish (Alepisurus ferox), 4 wahoo (Acanthocybium petus), 6 dolphin (Coryphaena hippurus), 1 skipjack bonito (Euthynnus pelamis), 1 opah (Lampris regius), 2 silk sharks (Eulamia floridan), 1 swordfish (Xiphias gladius).

Commercial-type long-line gear of nylon construction was used at all stations. On the first ten stations, frozen herring (Clupea harengus) was used exclusively for bait. The common butterfish (Poronotus triacanthus) was used on one station. At 8 stations both butterfish and herring were used with no appreciable difference in results.

After completion of fishing on the first 10 stations, 750 pounds of tuna were unloaded in Norfolk, Va., for shipment to the Washington, D. C., area.

In cooperation with the Woods Hole Oceanographic Institution and Virginia Fisheries Laboratory, bathythermograph casts were made and surface temperatures and other oceanographic data, morphometric data, and biological material were taken. Night lighting was conducted at each station.

The Delaware was scheduled to depart from East Boston on August 25, 1958, for a combined 5-day safety and gear research cruise in the Gulf of Maine, Georges Bank area.

New equipment to be tested includes an improved type winch head for use in hooking up the trawl wires, a pilothouse-operated control for emergency main engine stops, a distance reception test of an aluminum radar target, and a new plastic-type trawl float. Also distances to be covered over the bottom during trawling tows, employing standard #41 otter trawl, will be accurately measured over a buoyed course in the South Channel-Western Georges Bank area.

During this cruise a special lookout will be maintained for schools of small bluefin tuna and if they are sighted, advice on their position will be given the commercial fishing industry.



### North Atlantic Fisheries Investigations

SCALLOPS TAGGED AND LENGTH-FREQUENCY SAMPLES COLLECTED (M/V Albatross III Cruise 113): The U. S. Bureau of Commercial Fisheries research vessel Albatross III (June 19-26, 1958) collected length-frequency samples and tagged sea scallops on Georges Bank, and took 345 underwater photographs of the bottom at 7 different locations.

Fifty-six scallop dredge hauls were made for length-frequency and length-weight data; and 7,654 scallops were tagged and dropped on 13 different locations. A bathythermograph section was taken from Great Round Shoal along the southern edge of Georges Bank to the Southeast Part and up to the Northeast Peak.

\* \* \* \* \*

WHITING TAGGED AND LENGTH FREQUENCY SAMPLES COLLECTED (M/V Albatross III Cruise 114): Fifty-eight tows were made on Georges Bank and along the inshore waters of the New England coast to collect whiting (silver hake) for tagging. Bathythermographs were taken regularly after each tow during this cruise of the U. S. Bureau of Commercial Fisheries research vessel Albatross III (completed July 16, 1958).

A total of 2,500 whiting were tagged and released in 6 different locations, including Cultivator Shoals, Ipswich Bay, Cape Cod Bay, offshore Cape Cod, and SE. No Mans. An additional 1,200 fish were measured, and haddock and yellowtail flounder samples were brought back to the laboratory for detailed study.

\* \* \* \* \*

HADDOCK FISHERY FUTURE TO BE ASSESSED BY M/V "ALBATROSS III."

So as to obtain critical information on the abundance of baby haddock upon which the success of the commercial fishery will depend in the next few years, the U. S. Bureau of Commercial Fisheries research vessel Albatross III in August was preparing for an extended fall cruise. Catches of haddock since June have fallen off sharply due to a scarcity of young fish. The Albatross III cruises will attempt to measure the extent of this scarcity.

The stocks of Georges Bank haddock have been fished down to the point where the catches depend upon large numbers of comparatively small fish. Before 1950, the landings of large haddock (over 2.5 pounds) always exceeded the landings of scrod haddock (less than 2.5 pounds). Since 1950, scrod has exceeded large in the landings.

In terms of age, the fishery was once supported in large part by fish 5-9 years old, but in recent years 2- to 4-year-old fish have dominated the catches. The depletion of large fish has placed the fishery in a precarious position. Since 1950 a continual supply of small fish has been required to maintain the catches. Since haddock broods are frequently failures, the abundance of the precommercial sizes has been of extreme interest to the fishing industry.



Service's research vessel M/V Albatross III.

Fortunately, since 1950, there have been some extraordinarily large year broods so that the catches have been well maintained, although composed of smaller fish than in former years. The alternate year broods: 1948, 1950, 1952, and 1954 have been large ones. The intervening year broods have been failures. It has been realized for many years that two failures in succession would spell poor fishing for a year at least.

There are now indications that such a condition has occurred. The first reliable measure of the abundance of an incoming brood or year class is obtained when the fish are two years old. If the brood is a large one they begin showing up in the commercial landings as small scrod in June and July of their second year of life.

Last year these small scrod failed to appear which means that the 1955 year-class is a small one. This is in keeping with the alternation that has occurred in recent years. If the alternation continues, the 1956 year-class should be a big one. However, evidence is now appearing that this is not so. It is already late August and the small scrod are not being landed in quantity. This has had a serious effect on the landings during these summer months. For the period July 1 to August 15 Boston landings of haddock dropped from 14 million pounds in 1957 to 10 million pounds in 1958. The abundance of fish is expressed by the average catch per trip. This index dropped from 82,000 pounds in 1957 to 55,000 pounds in 1958 for the above period.

There is one possible hope for the immediate future. The 1956 year-class may simply be abnormally late in arriving. If it appears in September, all will be well for another year or two. If it does not appear, if this year-class is a failure, the abundance of commercial sizes of haddock on Georges Bank will be abnormally low for at least a year to come.

In this case interest turns to the next two year-classes that are present on the banks, the one-year-olds, spawned last year, and the young-of-the-year which were spawned in March of this year and which are just now settling to the bottom to take up their permanent habit as bottom feeders. The abundance of these two year-classes is of the greatest importance to the haddock fishery during the next few years.

Fish of last year's spawn are due to enter the fishery next year. Albatross III cruises of last year failed to turn up many of these fish. They are not expected to contribute much to the fishery. This scarcity focuses even greater attention on the brood to follow, namely, the current one of 1958.

There are signs that this current year brood is a large one. Fish of about four inches long have been reported in cod and pollock stomachs in large numbers, usually a sure sign of a big brood. In July when the Albatross III was fishing at mid-depth for ocean perch fry she encountered numerous young haddock where few had been found last year.

The fall cruises will give us a better estimate of the abundance of this critical year-class as well as additional information on the abundance of the one-year-olds. The vessel will survey the entire area of Georges Bank at all depths where small fish occur. She was scheduled to leave on September 22, when all of the new year-class is expected to have reached the bottom, and will work until October 24. The results of her survey will be announced upon her return.

\* \* \* \* \*

HADDOCK SAMPLES COLLECTED FOR ECOLOGICAL STUDIES (M/V Silver Mink): During a one-day cruise (June 8, 1958), the U. S. Bureau of Commercial Fisheries chartered vessel Silver Mink made observations and collected data for the haddock ecology study. The area covered by the cruise included the Highland Grounds north-northeast of Cape Cod Light in 29-32 fathoms. The area fished was  $\frac{1}{2}$  mile wide (east to west) and  $5\frac{1}{2}$  miles long (north to south). Three tows were made with an otter trawl having a  $1\frac{1}{2}$  inch mesh cod end. One bathythermograph lowering was made. All species were identified and enumerated in one sample tow and the important species were measured. A sample of dabs was collected for age and growth studies.

A total of 4,628 haddock were caught from which a sample of 1,064 were measured and scale samples were obtained from 91 male, 86 female, and 10 unsexed haddock. A total of 91 haddock was tagged.



In a sample of 48 male and 50 female haddock, fish weight, liver weight, gonad weight and state of development, and drumming muscle length, weight and color were recorded. Scales, fin rays, and stomach contents were collected.

Haddock were most abundant in the catch, with over 75 percent of them one-year-olds; ocean pout, longhorn sculpin, and whiting were next in order of abundance.

About 5 percent of the mature female haddock examined had running ripe eggs in the ovaries; the rest were completely spawned out. A few female whiting were observed with ripening ovaries.

\* \* \* \* \*

HADDOCK ECOLOGY STUDIES CONTINUED (M/V Shirley and Roland): Observations and the collection of data for the haddock ecology study were conducted by the U. S. Bureau of Commercial Fisheries chartered vessel Shirley and Roland during two cruises--on July 12 and August 9, 1958--in an area NNE. of Cape Cod Light, Mass.

During the July 12 cruise, two tows were made in depths of 56-58 fathoms, with an otter trawl having a  $1\frac{1}{2}$ -inch mesh cod-end liner. The area fished was 4 miles wide (east to west) and  $1\frac{1}{2}$  miles long (north to south). The first tow was aborted when it hung up after 5 minutes of towing. The second tow was one hour long but the net was badly torn when hauled back and very few fish were retained in the cod end. One bathythermograph lowering was made. No haddock were obtained for the purposes of the ecology study and, because of the extensive damage to the net, the cruise was terminated.

The August 9 cruise was conducted in depths of 32-59 fathoms. Five tows were made with an otter trawl having a  $1\frac{1}{2}$ -inch mesh cod-end liner. The area fished was 5 miles wide (east to west) and  $4\frac{1}{2}$  miles long (north to south). A total of 95 haddock were caught and measured.

In a sample of 30 male and 23 female haddock, fish weight, liver weight, gonad weight and state of development, and drumming muscle length, weight, and color were recorded. Also, scales, fin rays, and stomach contents were collected. No haddock were tagged, because of the high mortality of the fish in the holding tank on deck. A strong thermocline occurred at this station and it is presumed the fish died from the shock of the rapid temperature change to which they were subjected during haulback of the net.

All species were identified and enumerated in one sample tow and the important species were measured. Red hake were most abundant in the catch. Next in order of abundance were whiting, dabs, and skates. Haddock were extremely scarce. Some whiting and red hake with ripe ovaries were observed.

A sample of dabs was collected for age and growth studies. Two bathythermograph lowerings were made.

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LIFE HISTORY STUDIES OF INDUSTRIAL FISH AND SCALLOPS (M/V Jacquelyn Cruise July 18): During a one-day cruise (July 18, 1958), the U. S. Bureau of Commercial Fisheries chartered vessel Jacquelyn collected samples at the regular fishing and scallop stations off Block Island. Length frequencies were taken of many species of fish. Samples of scallops, butterfish, and yellowtail were brought back to the Bureau's Woods Hole Laboratory for study. There was a marked decrease in numbers of eelpouts (Macrozoarces anguillaris). Fluke have also moved off stations in shoaler water.

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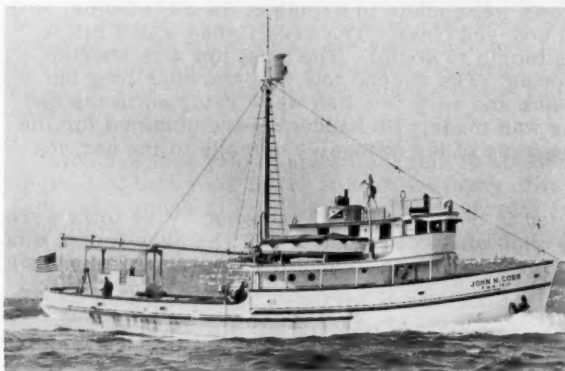
**LIFE HISTORY STUDIES OF FISH AND SCALLOPS** (M/V Jacquelyn Cruise August 18): Selected fish and scallop stations off Block Island were sampled on August 18 during a cruise by the U. S. Bureau of Commercial Fisheries chartered vessel Jacquelyn, operating out of Point Judith, R. I. Collections were made of scallops and other invertebrates.

Samples of scallops, red hake, yellowtail, butterfish, scup, blackback, and fluke were brought back to Woods Hole for study. Two dozen live gravid scallops were brought back for experimentation.



### North Pacific Exploratory Fishery Program

**SHRIMP AND SCALLOP SURVEY STARTED IN ALASKA** (M/V John N. Cobb Cruise 39): An 8-week exploratory shrimp cruise in Alaska by the U. S. Bureau of Commercial Fisheries vessel John N. Cobb was scheduled to begin on July 14, 1958.



Service's research vessel M/V John N. Cobb.

Explorations were to be conducted in the waters adjacent to Kodiak Island and in lower Cook Inlet. From Seattle, the vessel was to proceed to Seldovia on Kenai Peninsula and commence fishing activities in nearby waters. Work was to extend from this area to northeastern Kodiak Island.

Objectives of the investigations will be to determine the distribution, abundance, and species of shrimp inhabiting this region. Concurrent with the shrimp studies, an attempt was to be made to locate commercial concentrations of the large Alaska scallop.

The John N. Cobb was to use a variety of gear to carry out the studies: Gulf of Mexico flat and semi-balloon trawls, beam trawls, traps, and a scallop dredge.

The adoption and success of the shrimp peeling machine on the west coast of the United States has developed renewed interest as to the possibilities of developing a large shrimp fishery in the bays and ocean waters off Alaska. Several shrimp-peeling machines are now in operation in Alaska and more will be put into use this year.



### Oysters

**USE OF PLASTICS FOR COLLECTING OYSTER SET:** One of the problems facing the oyster cultivators of northern waters during the last two decades is the difficulty of obtaining sufficient quantities of oyster shells to be planted as cultch. The Milford (Conn.) Marine Biological Laboratory of the U. S. Bureau of Commercial Fisheries realized the existence of this problem and experimented with different materials that could be used as set collectors. The qualities that were sought in these materials were lack of toxicity to oyster larvae and spat, low cost, ease of handling, and versatile usage.

Early experiments conducted during the war and soon after, used some of the plastics available at that time and also materials used in insulating buildings. About 1950 the first efforts were made, under laboratory conditions, to secure oyster set on plastic films and screens. Most of these experiments were not too successful because the materials used were probably toxic enough to repel the larvae or cause their mortality. Nevertheless, the idea of using plastics continued to appeal to us and, eventually, in a series of laboratory experiments we found that several plastics, especially the polyethylenes, were fully suitable for the attachment of oyster larvae and, apparently, normal growth of young spat. Collectors made of the same material and placed in natural waters also caught set. Oysters attached to polyethylene collectors have been demonstrated at several meetings of biologists during the last few years.

Work on the development of various types of plastic collectors is being continued at our laboratory. We visualize collectors of various shapes and sizes adaptable to different sets of conditions. For example, in deep open waters, such as Long Island Sound, collectors resembling a spiral, three or four feet in diameter, perhaps several hundred feet long and anchored at the ends, may be used. Large areas of such collectors would not be touching bottom, a condition which will protect the recently set oysters from silting and, at the same time, from some of their enemies. These collectors will not interfere with navigation, and because of the depth they may be relatively safe during storms.

In ponds or well-protected bodies of water, sheets or strips of plastic of required thicknesses will hang vertically, utilizing, if necessary, the entire stratum of the water in which setting of oyster larvae is possible. The collectors may be suspended from regular floats, or so manufactured that their upper portions will contain large numbers of air bubbles acting like floats, while the bottom will be weighted down by some heavy material, such as sand. These two devices can maintain the plastic sheet collectors in a vertical position and, at the same time, off the bottom so as to protect the recently-set oysters from such enemies as starfish, drills, crabs, etc.

Before the ideal type of plastic collector is developed many improvements are needed. At present, we find that the surfaces of most polyethylene films are too smooth and this condition causes the oyster set to peel off the collectors as soon as it reaches the size of  $\frac{1}{8}$ -inch or somewhat larger. By making the surfaces coarser or incorporating in them, if possible, material like sand or fine particles of oyster shells, attachment of spat to the collectors may be more secure.

Another important aspect in the development of collectors is to incorporate in them or adsorb to their surface certain chemical compounds that will repel some undesirable aquatic forms, such as mussels, barnacles, tunicates, etc., thus preventing fouling. The same principle may also help to repel some of the predators, such as worms of the genus *Stylochus*, which usually set at the same time as oysters and soon begin to attack them. Some progress has already been made in this direction.

The cost of plastic collectors, per foot of the surfaces available for setting of oysters, may compare favorably with that of oyster shells. Some of the plastic films found by us suitable for the collection of set are sold for about one cent per



Oyster set on plastic materials at Milford Marine Biological Laboratory.

square foot if bought in large quantities. Considering that both sides of this material will be used in getting set, the actual cost will be less than one cent per square foot of collecting surface.

--V. L. Loosanoff, Director,  
Marine Biological Laboratory,  
U. S. Bureau of Commercial Fisheries,  
Milford, Conn.

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SPRING FRESHETS KILLED VIRGINIA'S JAMES RIVER SEED: Substantial kills of seed oysters in the upper third of Virginia's James River seed area followed unusually heavy freshets this spring, according to a report by an oyster biologist of the Virginia Fisheries Laboratory made to oystermen attending the 50th Annual Convention of the Oyster Growers and Dealers Association and the Oyster Institute of North America in Baltimore, Md., July 20-24, 1958.

"About 90 percent of the oysters on Deepwater Shoal, the uppermost bar in the James, were killed," the biologist reported. On other bars in the upper seed area, about 30 percent died. Fortunately, bars lower down, like Wreck Shoal, were not affected. Effects of these kills will be noted by tongers when the seed-oyster season opens in October.

Oysters brought to the Virginia Laboratory from the affected area and placed in running fresh water began dying after 17 days, but some remained alive 62 days. It is not known how long they had been subjected to fresh water before they were placed in running water. Laboratory scientists have determined that oysters which are gradually subjected to fresh water are able to survive better than those suddenly flooded.

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INDUSTRY PROBLEMS SUBJECT OF REMARKS AT OYSTER INSTITUTE OF NORTH AMERICA MEETING: Excerpts from the remarks by Assistant Secretary of the Interior Ross Leffler before the Oyster Institute of North America at Baltimore, Md., on July 21, 1958, follow:

"... Like many other fisheries today, you are faced with problems. Some of the problems are the result of man's doings. Had we had the technical know-how of today during the developmental periods of our Nation's growth, perhaps our situation would be different.

"But we didn't have that know-how and now we have problems. To many of us the magnitude of these trouble areas seems overwhelming. But, gentlemen, I am confident that there are none which we can't lick by working together. If we can join our forces--the industry, the States, and the Federal Government--in a well-organized team, I see no reason why the oyster industry will not assume its rightful place in our fisheries economy. To me, it looks like a bright future because we already have launched the kind of a partnership effort which is necessary. I am also encouraged by the commendable attitude of the oyster industry. In the face of all the difficulties being encountered, the industry is not sitting on its hands waiting for its problems to be solved but is striving on its own to get the answers. We're happy to be partners with that kind of courageous fighters.

"Let us quickly review the industry's problems--the age-old predator problem is still with us, the

problems of man-made influences, changing environment, pollution--and increased production costs are also with us.

"The Bureau of Commercial Fisheries is keenly aware of your problems and is forging ahead as fast as time and funds permit to help lick your problems. But, we are primarily a fact-finding organization, an organization which can help you through your industry and State agencies to meet the problems head-on.

"I know from an on-the-spot investigation that the Long Island Sound situation is bad. With starfish increasing some ten times in a single year and ruining up to 90 percent of the oyster crop in some beds, you oystermen are no doubt having a rough time of it. Incidentally, you should be commended on the fine efforts you have been putting forth to control these predators on the private oyster grounds. Unfortunately, starfish flourish on natural bottoms as well as on your managed grounds.

"Under ordinary conditions, the common control methods can do the job. But the present problem is so great that these methods can't do the job, particularly when no control is applied to the public beds. As you know, legislation has been introduc-



ed which authorizes funds with which to carry out an extensive emergency starfish eradication program. This program would not only protect the market oysters but would also protect the extensive seed beds so vital to production in New York, Connecticut, Massachusetts and Rhode Island.

"Of course you want to know what we are doing on this and other problems. With Saltonstall-Kennedy funds, our researchers are engaged in an extensive search for better predator control methods. Our people are screening hundreds of chemicals to see if any might be useful as selective poisons for starfish. As most of you know, we have had great success in the Great Lakes with selective poisons for sea lamprey. We feel that this chemical program is going to provide us with a very valuable tool to solve many fisheries problems.

"I would like now to mention also what we are doing in the way of research on that other common predator, the oyster drill. Most of you are aware that the copper barrier studies have been successful. Our biologists are now actively developing low portable fences containing copper and testing them under natural field conditions so that they can recommend to you the most efficient and economical types. We feel this advancement in our knowledge of drill control is a large step forward.

"Also we have contracted with several universities, State fishery laboratories, and other organizations for research into special studies on shellfish problems. I am pleased to report that all of our contract work is coming along exceedingly well and the results we hope can be applied in the very near future to achieve more efficient predator control and better oyster production.

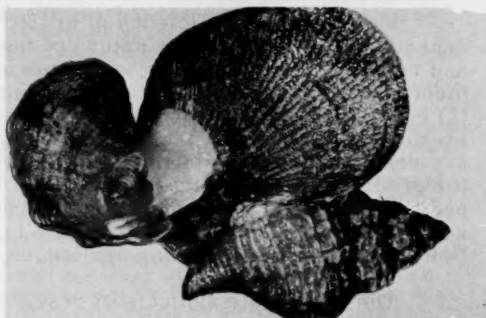
"We are particularly proud of the work which is being accomplished at our Shellfish Laboratory at Milford, Conn. Our researchers there are attacking the problem of increasing the production of seed oysters. The shortage of seed oysters from Chesapeake Bay northward is, as I understand it, one of your most serious problems and has been since around 1945. The biologists at the Milford Laboratory have already developed the basic techniques of artificial propagation of seed oysters. At the present time they are directing their efforts to making these methods commercially applicable. We feel confident that through artificial propagation we will also be able to selectively breed the most desirable oysters so that the industry can eventually produce nothing but a top-quality product.

"The destruction of seed beds in recent years by environmental changes from industrialization filling, dredging, and pollution has been a very serious problem. For that reason, I'm convinced we are striking right at the heart of our difficulties when we expand our efforts to restore the seed beds. You

will reap real benefits when those efforts begin to pay off.

"As another assistance to your industry, we have recently sent personnel to Europe and Japan to study their methods of oyster and fish farming. We will make those findings available to you at an early date.

"I am sure also that all of you here will be very pleased to know that the Interior Appropriations



Oyster drills attacking mussels.

Bill provides money for the construction of a new shellfish laboratory in the Chesapeake Bay area. Our people are now investigating possible sites and we will shortly select a location so that the construction can get under way as soon as possible. We anticipate the construction of this laboratory will provide a place for expansion of shellfish research so that we will be in a better position to tackle the problems of the industry.

"... We are all aware of the continued problems you encounter in terms of the amounts of "free liquor" in your product and of the large variations in its total solids content. Our technologists have studied these problems and only last year their expert testimony was requested on these matters in a Federal court case. We are presently engaged in developing plans for a three-way study of these problems, plans in which industry, the Department and the Food and Drug Administration will cooperate. I am sure that this will be a fruitful approach.

"In recent years, much study has been given to the well-known problems encountered when one wishes to market southern oysters in any but the fresh form. We haven't the whole solution, as yet, but enough is now known to justify continuation of the work in our Service laboratories on a semicommercial basis. We are certain that shortly you will be able to market these oysters in many other forms than those to which you have been accustomed and which have served to restrict the growth of your industry..."



## Pacific Oceanic Fishery Investigations

**ANNUAL REPORT FOR FISCAL YEAR 1958:** During the year (July 1, 1957-June 30, 1958) and the preceding fiscal year the program of the Bureau of Commercial Fisheries Pacific Oceanic Fishery Investigations (FOFI) has been in transition, from the exploration of high-seas fishery resources of the United States territories and island possessions in the tropical and subtropical Pacific Ocean to increasing the efficiency of utilization of these resources.

Increasing the efficiency of utilization may conveniently be considered in three aspects, which are: (1) the nature of the resource, its magnitude, size composition, and relation to stocks of the same species in adjacent areas; (2) the seasonal movements and migration in relation to oceanographic features of the environment; and (3) reactions of the fish to gear and related circumstances accompanying fishing operations. A knowledge of the first is a prerequisite for properly evaluating a fishery resource in terms of its commercial worth. A knowledge of the second is needed for predicting the location of schools of fish and so enable the fisherman to find expeditiously areas of commercial abundance of fish. A knowledge of the third would seem to be essential for any increase in the efficiency of the means of capturing fish and of improving fishing appliances.

The immediate subjects of research were concerned, however, with the surface tuna of northeastern French Oceania (Marquesas Islands), skipjack tuna in the Hawaiian waters, and the albacore of the northeastern Pacific. The investigation of the tuna in each of these areas represented, in one or more aspects, an attempt to reach the goals previously mentioned. Several supporting projects which relate not solely to one of the three research subjects listed are described separately, since in one form or another they contributed to all.

**Equatorial Tuna Program:** During September 1956, POFI initiated a survey program primarily planned to determine the geographical and temporal variations in abundance of the tuna, particularly the surface schools of skipjack, in the waters of northeastern French Oceania. Various oceanographic and biological observations were included. This program, consisting of 9 cruises to the waters surrounding the Marquesas Islands, was completed on June 23, 1958, with the return of the research vessel *Hugh M. Smith* to Honolulu. Analyses of the resulting data are presently under way with a scheduled completion date of June 1958. A preliminary review of these analyses reveals:

1. The abundance of the surface tuna schools reaches its peak during January-March, the Marquesan (southern hemisphere) summer. A standardized "inshore" survey path around the Marquesas Islands at an average distance of approximately 15 miles from land, was followed at least once each cruise for a total of 9 such surveys. An "off-shore" survey pattern, extending 225 miles seaward, was included in the program commencing with the November 1957 cruise. The rate of sightings of the surface schools for each survey is shown in table 1.

A study of the locale of the surface school sightings expressed in table 1 has not revealed any areas along either the inshore or offshore paths wherein concentrations of schools consistently occurred. Most of the surface tuna schools sighted were skipjack. Some yellowfin, which were usually found mixed in the schools with the skipjack, were caught. The general behavior of the tuna schools in the Marquesas area can be described as "wild" and fast-moving. The biting response to live-bait fish-

ing techniques was not particularly favorable. Of 1,146 skipjack measured, 88 percent were under 10 pounds, with most 4-6 pounds. Somewhat further south, in the waters surrounding the Tuamotus, larger fish were relatively more abundant with

Table 1 - Rate of Sightings of Surface Tuna Schools off the Marquesas Islands

Survey No.	Dates	Sighting Rate Per 10-Mile Run
<b>Inshore</b>		
1	September 7-14, 1956	0.7
2	January 25-30, 1957	1.8
3	February 23-29, 1957	1.7
4	October 14-21, 1957	0.6
5	November 24-30, 1957	0.8
6	January 18-25, 1958	1.3
7	February 27-March 5, 1958	1.8
8	April 11-19, 1958	1.0
9	June 1-10, 1958	1.2
<b>Offshore</b>		
1	October 24-December 6, 1957	0.3
2	January 28-February 11, 1958	0.8
3	March 26-April 8, 1958	0.6
4	May 15-29, 1958	0.6

skipjack over 10 pounds in weight comprising 43 percent of the samples. The biting response of the schools encountered during surveys in the Tuamotus was much more favorable than for those near the Marquesas.

A total of 4,461 skipjack and yellowfin were tagged using the POFI D-2 dart tag. To date, there have been no reported recoveries of these tagged fish. The lack of recoveries of these tagged Marquesan tuna is of interest when compared to the recoveries of tagged tuna in Hawaiian waters, where about 9 percent of all tagged fish have been recovered. The lack of recoveries in the Marquesas is of little significance, but the failure to make recoveries in other fisheries is, for it suggests the

"Marquesan population" is not being fished at present and thus represents an unutilized resource.

2. The bait used for live-bait fishing in the waters of French Oceania was the Marquesan sardine (*Harengula vittata*). In various bays of the Marquesas Islands, the availability of these fish to baiting techniques showed considerable variability. Ecological and biological observations accompanied each baiting operation. The results to date suggest that the supply of these sardines, at least in the shallower areas of the bays, are inadequate to support live-bait fishing by a tuna clipper on a commercial scale.

3. Preliminary results from three of the supporting biological studies--skipjack gonad, tuna larvae, and tuna food--are available. The mean diameters of the most advanced group of eggs from skipjack ovaries collected in Marquesan waters ranged from 0.37 mm. to 0.74 mm. Over 90 percent of the Marquesan skipjack examined had ovaries in which the most advanced group of eggs had mean diameters greater than 0.5 mm.

Although only one fully ripe skipjack has been caught, the distribution of larvae caught in plankton tows suggest rather extensive spawning in the area. For example, on an offshore survey conducted during the October-December cruise of the research vessel Charles H. Gilbert, the numbers of skipjack larvae taken (a mean of 2.0 larvae under a 10 m<sup>2</sup> area of sea surface in both the offshore and inshore sectors) indicate, on the average, that these larvae were distributed homogeneously throughout the area of the survey. The sightings of bird flocks and tuna schools, on the contrary, were much more frequent in the immediate vicinity of the Marquesas than farther offshore, with a tuna school sighting rate per 10-mile run of 0.5 along the inshore sector and 0.1 along the outer.

To date, stomachs from 370 skipjack caught in Marquesan waters have been examined, revealing a preponderance of fishes in their diet. Percentage occurrences of the various food items were as follows: fishes 59.9 percent, crustaceans 33.4 percent, molluscs 6.4 percent, and tunicates less than 1 percent. Of the food fishes, 27 families have been identified and, of these, 19 are primarily families of inshore or neritic forms.

**Mid-Ocean Skipjack Program: THE FISHERY:** An estimated catch of 3 million pounds in the Hawaiian skipjack fishery for the first 6 months of 1958 provides little hope of a profitable year for the industry. During the first 6 months of 1957 the catch was 3.1 million pounds and the year turned out to be the poorest (6.1 million pounds for the calendar year 1957) since 1948 and the war years.

The poor fishing during 1957 and the first half of 1958 have, however, provided unexpected aid in relating catch statistics to environmental changes. The theory that fluctuations in the fishery can be rationalized on the basis of changes in the environment has also received strong support from oceanographic and monitoring investigations.

**HAWAIIAN OCEANOGRAPHY IN RELATION TO THE FISHERY:** The work on the atlas of Hawaiian oceanography, which is essentially a climatic study of the ocean, has progressed far enough to indicate that the islands are bathed principally by either

downstream Kuroshio Current type of water or downstream California Current type of water. The former tends to predominate throughout the year except for the spring and early summer months when the latter seems to intensify sufficiently to spread into the high-islands region. In other words, the Hawaiian Islands are so located that the boundary between these two systems moves northward into the islands region in spring and then retreats southward at the end of summer. The seasonal migration of this boundary depends upon the relative strength of the two systems and at times may fail to move far enough north to traverse the high-islands region.

In connection with this work we are studying the rates of change of temperature at selected monitoring stations. Certain rates appear to be a characteristic feature of the locality so that deviations from the "characteristic" curves can be interpreted in terms of the environmental processes described above. This feature promises to become an important tool in interpreting data from the cooperative temperature and salinity sampling programs described later. In the vicinity of the Hawaiian Islands the boundary between the two systems is well defined by a relatively sharp salinity gradient. Thus in addition to the "characteristic" temperature curves, the salinity shows promise of being a very sensitive indicator of environmental changes.

With this oceanographic picture in mind, it now appears that the skipjack population is concentrated in the boundary between the downstream California Current type of water and the downstream Kuroshio Current type of water. The indices mentioned show that the oceanographic system was displaced southward during 1957 and the first 6 months of 1958 so that the boundary between the two types of water did not reach the islands. This may provide a basis for understanding the failure of the Hawaiian skipjack fishery during these two seasons. Admittedly, an examination of these oceanographic features for a series of "good" seasons would provide a better background for interpretation of the relations between skipjack availability and oceanographic features.

**LOCAL ENVIRONMENTAL STUDIES:** An intensive study of seasonal variation in Hawaiian zooplankton was completed. The study showed that if the island area is considered as a whole there is little seasonal variation in the amount of zooplankton. If the area is subdivided into windward and leeward sections, significant variations in amount and kind of zooplankton are apparent. These differences may well relate to seasonal changes in the flow pattern around Hawaii.

In addition to the environmental studies connected with the gross seasonal changes of the skipjack fishery, studies have been undertaken to determine factors in the environment which may be associated with local concentrations of fish. During the year an area in the vicinity of Cape Kaa, Lanai, where skipjack could be brought to the surface any time during spring and summer was studied intensively. This "concourse" provides an ideal laboratory to determine the environmental factors which make the location particularly attractive to skipjack. Experiments to determine the reason for the persistent occurrence of skipjack here are still in progress.

Another study has been initiated which is concerned with the influence of environmental factors on local fluctuations in the availability of skipjack. This is a study of temperature discontinuities as possible food-concentrating mechanisms. One such temperature discontinuity has been persistently found in the vicinity of the Lanai concourse. Preliminary investigations have shown that the discontinuity may contain 200 percent more fish eggs, 100 percent more fish larvae, and 50 percent more invertebrate plankton than the waters to either side of the discontinuity. The preliminary investigation also suggests that tidal currents in the vicinity of Lanai are involved in the formation of this discontinuity.

**STUDIES OF MOVEMENTS OF FISH BY TAGGING:** Tests of the dart-type tag, as a tool for studying the growth and migration of skipjack, are almost completed. From 10,360 releases, 1,038 or 10 percent have been recovered. Four long-term recoveries were obtained in which the skipjack had been at liberty for 260 to 282 days. The average growth of the fish amounted to about 7 pounds, or 0.8 pound per month. All recoveries were made within the commercial fishing area. The greatest net distance covered was about 330 miles, from Hilo, Hawaii, to Niihau.

The simplicity of the tag and rapidity of application, among other advantages, make tagging operations so efficient that the use of commercial sampans for this purpose becomes feasible. As a consequence, during the fiscal year, three charters were undertaken. The first was in September 1957 when 3,200 tagged fish were released in one week. During May and June 1958, two commercial sampans were chartered, one for operations in the vicinity of the island of Hawaii and one in the vicinity of the island of Kauai. During a two-week period one vessel released 2,000 tagged fish and the other 1,700. It is hoped that the results from these latter releases will give us some indication of the direction from which the skipjack population enters the fishery.

Minor improvements in the tag are still being made. The latest of these was the replacement of the barb, which was a short piece of  $\frac{1}{16}$ " nylon or lucite rod on the D-2 tag, with a new barb molded out of nylon. This change is not expected to affect the recovery rate, but may reduce breakages to a negligible amount during application.

The application of a dart tag is not, apparently, a particularly disturbing experience to the fish. On several occasions fish have been recovered immediately after their release while the vessel was still in the process of fishing and tagging from the same school. In another instance, a fish caught twice and tagged twice was captured a third time.

**Tuna Behavior: DIRECT OBSERVATION OF TUNA:** The usefulness of direct observations of tuna in relation to the circumstances affecting fishing in any program to improve fishing gear and methods is beyond question. The practicality of attempting direct visual observation at sea is, of course, another matter. During the early part of fiscal year 1958, POFI initiated a program for studying the behavior of tuna in their natural environment. A bucket constructed of steel and plastic in which the observer equipped with a breathing

device could watch the actions of a school of tuna during fishing operations was mounted on the research vessel *Charles H. Gilbert*. Although considerable data were obtained on the behavior of chum and of the tuna themselves during the direct observation by the observer, it became apparent that both still and moving pictures were desirable. Late in fiscal year 1958, a new bucket was constructed in which the observer could both directly observe and photograph the behavior of tuna without himself being submerged in the water. Several experiments were designed and successfully brought off in which a single variable affecting fishing was modified and the results of such modification clearly observed and documented. The usefulness of this method of direct observation seems to have been demonstrated.

**RESPONSE OF TUNA TO FISHING GEAR:** A preliminary study of the relation between water clarity and the efficiency of gill-netting and trolling for albacore was completed. The results showed that both sampling methods were affected—trolling in a negative sense and gill-netting in a positive sense.

**VARIATIONS IN THE RESPONSE OF SKIPJACK TO CHUM:** A study of data collected from sampans fishing skipjack by the live-bait method and of the stomach contents of the skipjack caught was completed with the following results:

Fifty-two percent of the schools chummed yielded no fish. The rate at which skipjack are caught during the fishing of a school increased to a peak and then decreased with elapsed fishing time. The percentage of fish in the stomach contents decreased with a decrease in skipjack size while the percentages of molluscs and crustacea increased. The genera *Decapтерus* and *Cubiceps* of the families *Carangidae* and *Nomeidae*, respectively, were the most important fish in the diet of the skipjack. The rate of catching large skipjack increased with distance from land. Fishing duration after the time of the highest catch rate was negatively correlated with the mean volume of the stomach contents. (Fishing of a school lasted longer if the stomachs were emptier.) Post-peak duration was also negatively correlated with the stage of digestion of the stomach contents. Skipjack feeding on fast-swimming fish were caught at a faster rate and fished for a longer period than those feeding on slow-swimming fish. Biting response was not affected by the time of day or weather conditions.

**LARVAL TUNA PROJECTS:** These projects were designed to solve problems in the identification and description of the larvae of various species of tuna and in their quantitative sampling. For the first mentioned, considerable work was done on material from the Dana collections, especially on *Auxis* and various species of *Euthynnus*. In an attempt to develop a good quantitative measure of larval tuna abundance, some 335 plankton samples were sorted for larval fish during the year. Most tuna larvae were captured between the surface and 60 meters' depth, with about 20-25 percent of the catch surface and 60 meters' depth, with about 20-25 percent of the catch between 70 and 130 meters, and practically none between 140 and 200 meters. There were marked day-night differences in catch at the surface but these became less at greater depths and were not present

in the 0-200 meter catches. Diurnal differences in the catch were attributed to vertical migrations and to dodging of the net during the day. Some evidence was presented indicating that the 60° F. isotherm may be limiting to the occurrence of tuna larvae. It appeared that the 0-200 meter tow produced more reliable abundance estimates than more shallow tows. No significant relation was found between the number of yellowfin taken by long line and the number of their larvae captured by the 0-200 meter plankton tows. Similarly, no significant relation was obtained between the number of skipjack schools sighted per 100 hours' scouting and the number of larvae taken by 0 and 0-60 meter tows.

**TUNA SEROLOGY AND PAPER CHROMATOGRAPHY:** In an attempt to develop methods which might enable an identification of larval tuna to be made without reference to morphological characters and to distinguish populations of various species of tuna when it becomes appropriate to study this problem, a joint study was begun with Bureau installations in Seattle on the serology of tuna as a means of distinguishing species and different populations of the same species. Numerous blood serum samples were collected from albacore, skipjack, yellowfin, little tuna, and dogtooth tuna and shipped to the Seattle Biological Laboratory. Preliminary tests showed no individual differences among albacore, but slight to moderate differences among individual skipjack and yellowfin. In general, species separation of adult tuna is quite easily achieved with serological techniques. A microdiffusion technique requiring 0.02 milliliter of serum was also employed successfully in distinguishing species. Initial tests of paper chromatography as a tool for differentiating species of tuna were conducted late in the year. If successful, it is hoped to employ this technique for the identification of tuna larvae. No definite report can be made as yet on the results.

**QUANTITATIVE TUNA FORAGE SAMPLING PROJECT:** In order to better understand the relation of tuna abundance and tuna forage, laboratory analysis was completed on approximately 288 mid-water trawl collections taken on 23 cruises, employing trawls of four types, and the data are being studied critically. These data were obtained through the operation of a 6-foot beam trawl, a 1-meter ring trawl, a 6-foot Isaacs-Kidd trawl, and a 10-foot Isaacs-Kidd trawl. A Nanaimo-type mid-water trawl was obtained late in the year and will be tested on forage organisms next fall.

**ARTIFICIAL CULTIVATION OF TUNA BAIT FISH:** The apparent magnitude of the populations of surface dwelling tunas about island areas in the tropical Pacific would seem to be beyond the capacity of available bait-fish supplies to permit adequate levels of exploitation using the live-bait fishing method for the capture of tuna. This is clearly true for, as an example, the Hawaiian skipjack fishery. Also for that fishery, the principal species of bait presently being utilized has a low survival potential. POFI is engaged in a 4-point program to help alleviate these conditions. Since it had been demonstrated that young tilapia (*Tilapia mossambica*) was a satisfactory bait fish for use in the skipjack fishery, and since it appeared to offer the best possibilities for bait-fish culture of the immediately available species, our efforts

have been concentrated on this fish. First, a laboratory program is continuing with studies of the ecology, nutrition, and diseases of young tilapia. Second, in collaboration with a local fishing concern, a semicommercial-scale plant was established to determine the economic possibility of rearing large quantities of bait-size tilapia in concrete tanks under well-controlled conditions. This project got under way in January when the brood tanks were stocked with 2,000 adult fish. The production of young during the spring months has been as follows: February 768, March 20,190, April 20,629, May 31,200, June 160,000; Total 232,787. With the advent of increased water temperature, the plant is now producing close to the anticipated yield of young fish. Moderate mortalities have been experienced due to a variety of diseases and to predation by dragonfly larvae.

In addition to this rearing project, a contract was negotiated with the Hawaii Division of Fish and Game concerning a program for rearing tilapia in small ponds to determine the biological and economic success of this culture method as compared with the more concentrated tank system.

Attention was also given to other species which might be useful in solving Hawaii's bait-fish problem. In cooperation with the Hawaii Division of Fish and Game, POFI arranged for the introduction of a small lot of threadfin shad (*Dorosoma petenense*) which will be cultured and tested as a tuna bait fish, and varying amounts of the Marquesan sardine were released in Hawaiian waters following each trip to the Marquesas area. Though there have been several recoveries, there is no clear indication that the species has become established here.

**Albacore: DISTRIBUTION:** Two facets of albacore distribution in the North Pacific were studied during the past fiscal year. The first was concerned with fish in the central and eastern areas and the second in the northern areas of the west coast of North America. These studies were directed towards an understanding of the relations between variations in albacore abundance and variations in the physical and biological features of the environment. The results indicate, when considered with returns from tagging, that (1) both of the major North Pacific fisheries, American and Japanese, fish the same stock or stocks of albacore. (2) the migration route of the albacore between these two fisheries is through the central North Pacific and is such that an untapped resource is present in this area during the summer, and (3) a tentative hypothesis can be drawn concerning the details of albacore migration through the central North Pacific. This hypothesis suggests that there are three groups of migrating fish with the one containing the smallest fish performing a complex migration between the fisheries. A portion of this group is retarded in their movement to the west coast by the development of summer productivity in the boundary between warm transition zone water and nutrient-rich subarctic water south of the Aleutian Islands.

Plans have been completed for the assessment of the commercial potential of this group of fish south of the Aleutian Islands. A contract has been awarded to a commercial vessel to test the commercial feasibility of this area this summer (July-



September 1958). Concurrently, a POFI vessel will conduct a survey of biological and oceanographic conditions associated with the presence of albacore in the area and will also conduct a limited amount of fishing to determine the efficiency of certain fishing gears.

The Northeastern Pacific Albacore Survey (NEPAS) was conducted in July-August 1957 to map the distribution of albacore off the northern portion of the United States west coast, and to determine whether the distribution was related to oceanographic and biological phenomena. NEPAS differed from previous albacore cruises in that it represented a transition from broad to more specific studies. A different survey method was also used so that detailed problems of microdistribution could be investigated. Instead of having a Bureau vessel do both fishing and related oceanographic and biological studies, 7 commercial vessels were employed in a quasi-synoptic trolling survey while two Bureau vessels made detailed studies of the microdistribution of albacore and biological and oceanographic conditions. Preliminary analysis of the fishing and oceanographic data indicates that albacore were scattered throughout the area, with concentrations of possible commercial magnitude found on the warm side of the band of upwelling along the coast. The largest of these concentrations were in cells or tongues of warm water which extended shoreward between cells of cold water.

**BIOLOGY:** In August 1957 a biologist was sent to American Samoa to institute an albacore gonad sampling program at Pago Pago. Long line-caught albacore from a wide area in the tropical Pacific are delivered throughout the year to the cannery by Samoa-based Japanese fishing vessels. Arrangements were made to obtain seven pairs of gonads from each vessel landing. Cannery personnel were instructed to weigh and measure the fish and collect the gonads which are shipped frozen to POFI for study.

The program progressed satisfactorily and as of April a total of 964 albacore was sampled. Each shipment of gonads was accompanied by an excellent log which gave the length and weight of each fish as well as the location of its capture. Laboratory examination of the gonads will commence early next fiscal year.

Two survey projects of general interest were completed. One involved assembly of all available Pacific albacore catch records to see if there was any indication of a leveling off of landings despite generally rising effort. Though the data are somewhat unsatisfactory they give no indication that fishing is affecting the stocks. Rather, there is a parallel rise of effort and catch through a background of erratic fluctuations. The second project was to assemble all data on seasons and areas of catch of Pacific albacore.

**TAGGING:** Seven albacore tag recoveries were reported during the year. This brings the total of POFI recoveries to 11. The data for all recoveries are summarized in table 2.

Of the 7 recoveries, 4 were of fish tagged off the West Coast during NEPAS. Two of the NEPAS recoveries were relatively short-term and were

retaken in 47 and 77 days, respectively. Both fish showed little net movement during the intervals and were recaptured during the same season in the West Coast fishery. The other two NEPAS releases (Nos. 10 and 11), one of which was a release by the chartered vessel, the M/V Flicker, and the other by the Hugh M. Smith, were recaptured on the Japanese side of the Pacific in little less than a year; each showed a net movement of more than 4,000 miles. These fish had moved clear across the Pacific from the American fishery to the Japanese live-bait fishery and were retaken there.

In addition, there were two recoveries of fish tagged in mid-ocean; one was tagged in October 1955 and the other in July 1956. The first fish was recaptured in the Japanese long-line fishery in November 1957 and the second in the United States west coast fishery in July 1957, thus demonstrating once again a movement in both directions from mid-ocean. Another recovery was of a fish tagged off California in November 1956 and retaken in the Japanese long-line fishery one year later. These tag recoveries support the contention that there is a single intermingling population of albacore in the North Pacific.

The last recovery (No. 11) was of particular interest since this was the first time in which an albacore was successfully tagged with the POFI dart tag. This albacore was one of 111 released with the POFI-developed dart tags during NEPAS.

**EASTERN NORTH PACIFIC TEMPERATURE CHARTS:** One of the prime difficulties in oceanographic work is in obtaining synoptic data over a wide area. The meteorologist is not presently confronted with this problem because he has a network of weather stations at his disposal over most land masses. He can also obtain synoptic reports of weather conditions at sea from commercial and naval vessels.

These marine weather reports have been made available to us by the Honolulu office of the U. S. Weather Bureau. Ships' messages relayed to the Weather Bureau include, among other things, reports of position, sea and air temperatures. We have utilized the sea temperature data to construct quasi-synoptic charts showing isotherms east of the 180° meridian. Data are taken from the middle 10 days of each month, plotted, and averaged over 1-degree squares. The resultant isotherms give us a picture of sea temperature from the Aleutian Islands to about 20° N. latitude. Combined with Japanese charts to the west of 180° the surface distribution of temperature is available for the entire North Pacific.

In the region between 30° S. to 20° N. latitude, temperatures are shown as averages over 1-degree squares. The averages themselves are shown because in this region shipping coverage is insufficient to allow us to draw isotherms.

Charts have been completed for each month in 1957 and will be prepared for all months of 1958. Data available for certain seasons prior to 1957 will also be utilized. In addition to the isotherm charts, charts are prepared which show variations of temperature from the 30-year mean and year-to-year variations.



The temperature anomalies which these charts show raises the question as to the mechanism of generation of such anomalies. For example, are

timite of the energy available to the sea from direct solar radiation can be attained. This will at least tell us about the part insolation plays in the

Table 2 - POFI Albacore Tag Recoveries

No.	Date Tagged	Position of Release		Date Recaptured	Position of Release		Distance Traveled (Miles)	Days Out	Weight Gained (Lbs.)
		Latitude	Longitude		Latitude	Longitude			
1	10/4/54	46°30' N.	159°18' W.	11/28/55	35°45' N.	157°39' E.	2,055	420	-
2	10/5/54	43°31' N.	161°16' W.	1/19/56	35°23' N.	141°20' E.	2,670	471	ca. 40
3	10/9/55	42°16' N.	147°16' W.	6/24/56	31°54' N.	158°37' E.	2,660	259	ca. 4
4	10/17/55	44°55' N.	144°48' W.	8/1/56	31°21' N.	117°17' W.	1,515	288	ca. 6
5	7/31/56	44°31' N.	174°55' W.	7/23/57	30°08' N.	119°03' W.	2,775	357	ca. 5½
6	8/1/57	34°49' N.	121°57' W.	9/17/57	34°49' N.	121°26' W.	26	47	-
7	7/22/57	35°43' N.	122°58' W.	10/7/57	36°24' N.	123°07' W.	41	77	-
8	10/16/55	43°40' N.	144°40' W.	11/23/57	33°22' N.	174°07' E.	2,025	769	ca. 22
9	11/17/56	36°44' N.	127°37' W.	11/17/57	38°08' N.	174°53' E.	2,800	365	ca. 15
10	7/23/57	42°20' N.	127°33' W.	5/26/58	32°15' N.	144°15' E.	4,230	287	ca. 6
11	7/22/57	47°00' N.	126°18' W.	6/10/58	33°40' N.	144°00' E.	4,300	323	-

the colder than average waters the result of reduction of incoming solar radiation, the advection of relatively colder waters, or the result of mixing caused by greater wind stresses? Probably all of these factors enter into the picture. In order to evaluate one factor, namely differences in incoming radiation, we are in the process of examining cloud cover data from ships' reports on file at the U. S. Weather Bureau and the University of Hawaii.

From the observed cloud cover distribution an estimate of the energy available to the sea from direct solar radiation can be attained. This will at least tell us about the part insolation plays in the

development of relatively warmer or colder waters.

The surface isotherm chart is a useful presentation from several points of view. To the oceanographer temperature contours give an indication of current direction since flow tends to take place parallel to isotherms, at least in the regions of swiftest flow.

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**UNDERWATER PHOTOGRAPHIC EQUIPMENT TESTED AND TUNA FEEDING BEHAVIOR STUDIED (M/V Charles H. Gilbert Cruise 39):** Underwater Observation Techniques: Underwater photographic equipment was tested by the U. S. Bureau of Commercial Fisheries research vessel Charles H. Gilbert during a cruise from May 30 to July 3, 1958. Movies were taken of a strip of plywood 48 x 8 x ½-inches divided into 8-inch square panels of white, gray, black, blue, and red. Distances varied from 10-100 feet. Various types of film were observed when exposed at the recommended exposure opening, and at one stop above and one stop below the recommended opening.

Water bubbles caused by turbulence gave much trouble. Fishing was tried at a dead stop, with the ship going at 50 r.p.m. (slower than usual fishing speed), and chumming was done from the position of the forward brine tanks. This worked best and movies were taken out of the side porthole. Water was prevented from slopping over the top of the observation chamber by the attachment of a plywood hatch cover.

**Skipjack Feeding Behavior:** Experiments to determine the effect of dead bait, water sprays, tilapia, differing rates of chumming, and sound on skipjack feeding were conducted at the Lanai concourse. In general, the activity of the skipjack was lessened and the skipjack went deeper with tilapia, dead bait, and without sprays. The effect of changing the rate of chumming depended on the size of the school. In small schools the skipjack fell back with increased chumming, but in large schools, activity increased with increased chumming. Sound caused by beating on the hull with metal hammers had no effect.

The effect of water sprays on the feeding of 20- to 30-pound skipjack was tested. The skipjack seemed to be closer to the surface when the sprays were on.

**Sea Scanar Observations:** The port transducer of the sea scanar was not tilting properly at the beginning of the cruise. On June 28 the tilt control of the starboard transducer was also found to be faulty.

**Test of the Floy Dart Tag:** Off Cape Kaea, Lanai, 479 skipjack were tagged and another 120 were tagged north of Kahului, Maui. Of these, 318 were tagged with the Floy tags. Of the skipjack caught, 10 percent were saved as samples for length, weight, stomach contents, and gonad condition.

**Oahu Environmental Monitoring Survey:** Bathythermograph casts were made and surface salinities collected at various stations off Oahu Island during May 30-June 1 and again during June 20-21.

**IGY Stations:** Stations No. 11 and No. 12, established for the International Geophysical Year were occupied according to routine on May 30 and June 21-22. During the first occupation, two additional 0-300 meter Nansen bottle casts were made for temperatures and salinity samples.

**Lanai Environmental Survey:** Bathythermograph casts, collection of surface salinity samples, and plankton tows were accomplished as prescribed for various stations off Lanai except for 4 stations where hazardous circumstances precluded work.

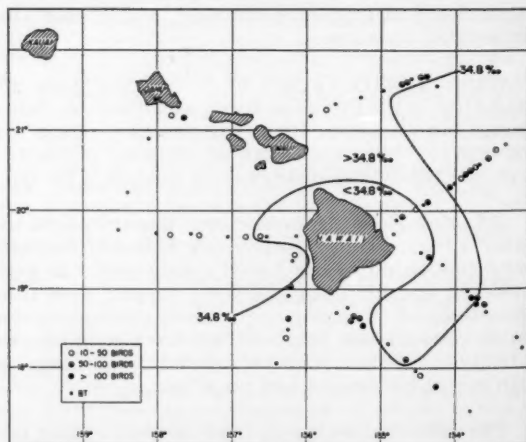
**General Observations:** Ten dolphins (*Coryphaena hippurus*) were caught on the trolling lines. Weather observations were recorded and transmitted whenever the ship was at sea and as time permitted.

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**OBSERVATIONS TO DELINEATE NORTHERN BOUNDARY OF DOWN-STREAM CALIFORNIA CURRENT TYPE WATER NEAR HAWAIIAN ISLANDS (M/V Charles H. Gilbert Cruise 40):** During the cruise 40 (July 14-21, 1958) of the research vessel Charles H. Gilbert six lines of stations were run during daylight hours extending from land seaward in order to delineate by means of surface salinity and temperature observations the northern boundary of down-stream California Current type of water. On these runs, bathythermograph and surface salinity observations were made every 3 hours and a careful watch was maintained for bird flocks as signs of fish schools. In addition, seven 60-meter oblique plankton tows were made near the start and finish of several seaward legs. The vessel is operated by the Bureau of Commercial Fisheries Pacific Oceanic Fishery Investigations from Honolulu.

On two legs to the southeast of Hawaii the boundary between the western North Pacific water and down-stream California Current water was well defined by sharp salinity gradients. On the average these gradients were approximately 5 times as great as the average latitudinal rate of change of salinity between 10° and 22° N. and can be readily detected.

The active bird flocks with more than 50 birds are predominantly found in the lower salinity water and specifically in the vicinity of the boundary between western North Pacific and downstream California Current water (see figure). On one of the two crossings of the boundary to the southeast of Hawaii, 4 large schools were sighted one of which was positively identified as skipjack tuna.



Charles H. Gilbert Cruise 40, Bird flock sightings & salinity boundary.

The absence of bird-flock activity was particularly pronounced on the run from Maui northeastward to 75 miles offshore and from Kailua, Hawaii, westward. In each case the salinity encountered was well above that encountered in areas where bird flocks are found.

Incidental to the scouting, a small temperature discontinuity 10 miles south of the southern tip of Hawaii was encountered. Three surface plankton tows were made, one in the discontinuity, and one on both sides of it.

The eddy in the lee of Hawaii, which has been described by POFI scientists as a semipersistent feature, was also crossed. It appeared to be centered about 30 miles west of Kailua, Hawaii.



### Portion Control Automatic Machine for Fish

An automatic portion control machine for fish processing has been developed by a Washington State poultry equipment firm. The unit also has application in the rest of the food processing industry.

The unit has a capacity of 2,700 pieces an hour, with accuracy reported to be within a fraction of an ounce.

In operation, pieces of frozen fish travel along a conveyor track to be sorted into six weight groups between 4 and 10 ounces.

Two stations are assigned each weight group to synchronize with the movements of an operator using both hands to load the conveyor.

A beam balance at each station is connected by a solenoid coil to the tripping mechanism. Mercury switches are used throughout. (Frosted Food Field, June 1958.)



### Red Tide

FEDERAL AND STATE BIOLOGISTS SEEK MEANS OF CONTROL: A relentless search for a weak spot in the life cycle of the organism responsible for the red tide is being sought by biologists of the U. S. Bureau of Commercial Fisheries. Red tide is a water condition which has occurred periodically in the Gulf of Mexico for more than a century. It is often accompanied by fish kills so great that untold millions of dead fish float for miles along adjacent shores. It gets its name from the color of the water, often but not always red. The coloring is caused by the presence of Gymnodinium breve, an organism so tiny that more than a thousand of them could line up on an inch of hair. The organism is probably always present, but develops into dangerous proportions with great rapidity when conditions are right to start the "bloom."

The last outbreak occurred in October 1957 off Florida's West Coast. Past research has indicated that application of copper sulphate to an infested area might bring about the desired results. Many tons of this material were used in an effort to break the back of the October outbreak which appeared and developed suddenly in spite of the many official and unofficial sea and air patrols made to spot any indication of red-tide infestation.

At a meeting early this year at the Galveston, Tex., research laboratory of the Bureau, 33 American scientists representing State, Federal and private research

groups met to evaluate past red-tide research and to formulate plans for the continuing of red-tide investigations.

The scientists generally agreed that the copper sulphate treatment, given a good test during the fall, was not the answer to the problem for three reasons--the cost of extensive application would be enormous; its effect is short-lived; its side effects on other marine life is uncertain. It was also agreed that the cost of patrolling Florida's west coast on a round-the-clock basis to spot incipient outbreaks would require fantastic numbers of men and machines. The consensus was that victory over red tide seems a long way off and that victory can best be won by hard work and through the cooperative efforts of State, Federal and private agencies.

A final decision of the type of cooperative program to recommend was held in abeyance pending a thorough sifting of all data presented. But the probable line of attack will be a close-knit effort by the Florida State Board of Conservation and the Bureau. This approach will include:

(1) continued laboratory studies with living red-tide organisms to seek a control mechanism, possibly some associated microscopic animal food element or chemical that checks red-tide growth; (2) exhaustive studies to be made in selected areas on Florida's west coast to determine the conditions of life required by the red tide. It is the hope of the biologists that a better knowledge of the organism in its natural surroundings, coupled with the results of laboratory studies, may show a weak link in the life cycle that will allow its effective control by man.

Bureau biologists, who have been investigating the problems for the past 11 years, showed that the red-tide organism, first isolated in 1947, is widely dispersed in the Gulf of Mexico. Painstaking research at the Galveston laboratory has produced bacteria-free cultures of red tide that are poisonous to fish, a demonstration vital in proving that massive outbreaks of the organisms in nature are the direct cause of fish kills.

The first recorded appearance of this fish-killing plague was in 1844. It occurred again in 1954, 1878, 1882, 1883, 1908, 1916, and in 1946. Its earlier appearances have been described as "poison water," "black water," "yellow water," and "rotten water." The term "red tide" is actually a misnomer for there is no "tide" and sometimes the water is green interlaced with yellows and browns.



## Salmon

ALASKA'S AFOGNAK FISHWAY BRINGS LARGE RED SALMON RUN TO ONCE BARREN WATERSHED: A large run of 7,000 adult red salmon, derived from planted eggs, returned during June and July 1958 to the Pauls Bay Fishway on Afognak Island, the Director of the Alaska Department of Fish and Game, reported on July 23, 1958.

This is the largest run of reds since the Department surmounted the 23-foot falls with a fishway in 1952, to open the hitherto barren 550-acre Laura Lake to salmon spawning. The higher rate of survival of the 1958 red salmon indicates that runs of commercial importance will be returning to Laura Lake much sooner than was expected.

The 7,000 red salmon that ascended the ladder this year were produced from a 1954 plant of 450,000 eggs taken from 180 females in nearby Perenosa Lake.

Since the Department constructed the fishway to open Laura Lake, eyed eggs have been planted in the lake's inlet stream to introduce runs to the once barren area.



Returns of adult red salmon in 1955, 1956, and 1957 from the egg plants made in 1951, 1952, and 1953 fluctuated between 200 and 500 adult fish yearly. The annual plant-ing ranged from 210,000 to 500,000 eggs.

It is estimated by Department biologists that an annual catch of 10,000 red salmon and an escapement of 7,000 would assure a good sustained yield for a water-shed of this size.

One of the main functions of the Commercial Fisheries Division of the Depart-ment is to open up watersheds now blocked by falls and other barriers to salmon spawning.

There are numerous potentially-productive watersheds in Alaska, now blocked by falls, which would lend themselves to this type of a program, the Director states. Some of these are now under investigation for further fishway possibilities.



### Saltonstall-Kennedy Act Fisheries Projects

**ALLOCATION OF FUNDS FOR COMMERCIAL FISHERIES PROGRAMS:** The allocation of \$5,042,000 of Saltonstall-Kennedy funds for commercial fishery investi-gations during the fiscal year ending June 30, 1959, were approved on July 13 by Secretary of the Interior Fred A. Seaton.

The Saltonstall-Kennedy Act provides that 30 percent of the money derived from import duties levied on fishery products be directed to increasing the production and con-sumption of domestically-produced fish and fishery prod-ucts. The activity is under the jurisdiction of the U. S. Bureau of Commercial Fisheries.

Almost \$700,000 is included for various projects relating to salmon, such as \$608,500 for projects in Alaska and \$100,750 for North Pacific studies which will include con-siderable salmon work.

Other allotments are: Northwest Atlantic fisheries, \$539,000; Great Lakes and inland waters, \$174,000; sardine studies, \$387,350; oyster projects, \$300,300; shrimp, \$295,000; tuna, \$258,000; menhaden, \$87,000; striped bass, \$56,500; king crab, \$22,500; Pacific Coast rockfish, \$16,000. There was \$112,000 provided for the study and control of red tide, \$54,800 for Pacific oceanographic studies; \$24,000 for hydrographic studies on the Atlantic Coast; \$10,000 for fishing vessel and insurance studies, and \$54,185 for coor-dination of Saltonstall-Kennedy projects in southern Cali-fornia.

Allocation for activities not necessarily related to a specific fish or fishery include: economic studies, \$152,000; Market News, \$130,000; promotion of use of domestically-produced fishery products through fish-cookery demonstrations, and related public service radio and TV demonstrations, \$100,000; market promotion, on a national scale, through cooperation with press, radio, TV, and other media at local, State or national levels, \$257,000; market research and analysis studies and related activities on a national scale, \$160,000; coordination of these market-ing activities, conduct of foreign marketing programs, and liaison and consulting services, \$61,000; special reports on trade, tariff and legislation, \$74,000; continue collection throughout the United States of fishery statistics on oper-ating cost, catch, and manufactured products and the expe-diting of publication of these data for use by the industry, the States and other S-K projects, \$175,700; gear research, \$62,500; and technological studies on subjects of national scope, including standards for fishery products, new uses for fish oils, and nutritive quality of fish meal, and Great Lakes fisheries utilization problems, \$390,915. In addition \$296,000 was allotted for administrative purposes.

Note: See Commercial Fisheries Review, March 1958, p. 29.

The money made available for salmon investigations will be utilized as follows: development of methods of counting and recording escapement, \$162,000; studies of migrations, predators, the effects of logging and other environmental factors, \$240,000; development of more accurate methods of predicting salmon runs, \$153,000; analysis of fishery research data already accumulated and supervision of con-tact projects, \$30,500; fishery surveys of Alaska rivers north of Bristol Bay, \$23,000.

All three of the herring or sardine areas are getting funds for various types of investigations--for the identification of the Alaska herring populations and for the development of methods of predicting abundance, \$119,000; for a cooper-ative program of research on the fluctuation in abundance of the Pacific (California) sardine, anchovy, and mackerel, \$116,350; for biological studies of the Maine herring or sardine, \$102,000, to be used together with another \$50,000 in the exploration category.

The funds to be used on the oyster projects are distri-buted as follows: New England research, \$100,000; Middle Atlantic, \$128,000; Gulf of Mexico, \$32,000; technological studies in Middle Atlantic and Gulf States on background for oyster standards, and problems relating to the canning, freezing, and composition of fishery products in these areas were given \$40,300.

The shrimp funds are distributed \$131,000 for research on nursery grounds and shrimp migrations; \$48,000 for tagging shrimp at sea in the Tortugas fishery; \$91,000 for exploratory work in the Gulf and South Atlantic, and \$25,000 for a statistical survey of the Gulf of Mexico bait shrimp industry.

To provide additional research on albacore tuna and to define the location of stocks in waters north of Hawaii, \$225,000 has been made available; for a study of improving tuna quality by improving methods of freezing tuna at sea and bettering other stages of the processing \$33,000.

Great Lakes and inland fisheries research has been allocated \$103,000; explorations, \$36,000; and technological studies, \$35,000. Commercial propagation of catfish was given research funds of \$6,000.

Among the projects which should develop results benefi-cial to many sections of the domestic fishing industry are such studies as development of voluntary quality standards for fishery products, \$195,000; new uses of fish oils, \$100,000; studies on nutritive value of fish meals, \$46,415; effects of distribution upon frozen fish products, \$25,000; market research to determine basic marketing patterns for canned fish, \$42,000; and promoting the use of domestic fishery products through education and market development, \$416,500.



### Tuna

**MORE DETAILS ON NEW DEVELOPMENT IN FREEZING TECHNIQUES ON PURSE SEINERS:** A new method for freezing tuna on vessels was developed in 1957 by a practical Pacific Coast fishing vessel engineer and some of the details were reported in the July 1958 issue of Commercial Fisheries Review (p. 44). Ves-



Fig. 1 - General view of the tuna purse seiner Jo Ann which is using the new method of freezing tuna on the vessel.

sels with a coil refrigeration system are plagued with inadequate refrigeration. Conversion to a brine-freezing system is very expensive. The new system is a compromise brine system which builds a reserve of ice on coils to meet refrigeration needs with a minimum of machinery. This additional information and photographs showing some details of the new system installed in the purse seiner Jo Ann were received from the San Pedro Market News Office.

Note in figure 5 that the fish in the lower portion are stacked fore and aft. Two men go into the hatch when the fish are being loaded aboard and guide them into position. The upper third are crossed more (crossed fish can be piled higher) because there is no room for a man to work below when the pile of fish reaches the top. This is no different than on regular brine-freezing vessels as they have the same problem. The fish frozen with the

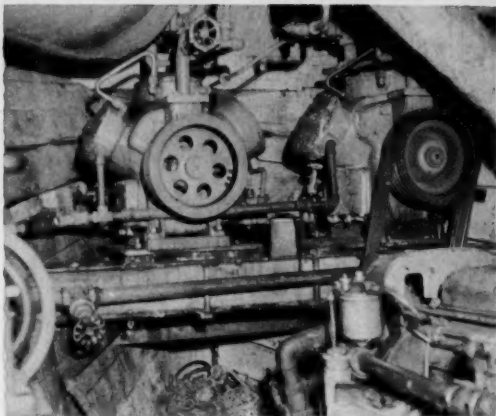


Fig. 2 - Two high-speed 6-cylinder ice machines with a capacity of 10 tons each aboard the Jo Ann. Direct drive off 3-cylinder 60 hp. auxiliary engine which also runs the brine-circulating pump and winch and which can run off 230-hp. main engine also.



Fig. 3 - Showing the hatch aboard the Jo Ann just a few minutes after the cover was removed and unloading commenced. The fish are yellowfin tuna averaging about 18 pounds each.

new coil system are all loose and can be picked out by hand, while in regular purse seiners with other refrigeration systems they would be still frozen to one another

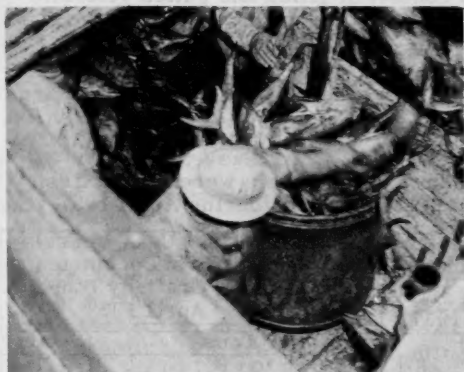


Fig. 4 - Bringing up frozen yellowfin tuna from the hold of the *Jo Ann*. One of the planks which form one of the two fore and aft partitions is shown.

and would have to be broken loose by means of a bar or pick, which damages the fish.

The ice on the coils is built up to more than one foot in diameter (see fig. 6). When the brine water is released into the hold, this ice melts, rapidly cooling the brine water. When most of the ice is melted, the brine water is near 32° F., and the fish have been properly chilled. The temperature in the coils is then lowered to -20° F.; the temperature of the brine water then drops to -20° F.

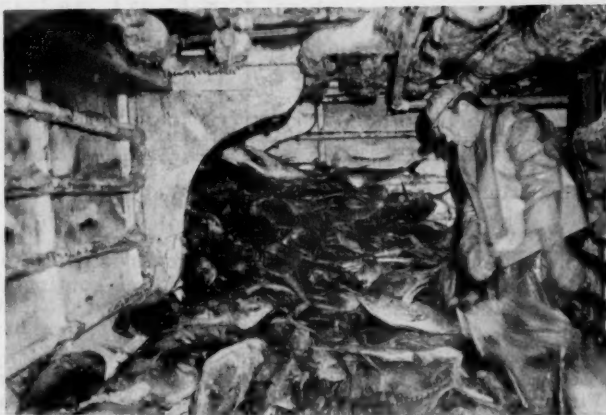


Fig. 6 - Starboard view of the *Jo Ann's* hold. Notice ice on coils. These coils, as well as those on the sides, are the ones that the water is sprayed onto.

Note: Also see *Commercial Fisheries Review*, July 1958, p. 44.

\* \* \* \* \*

**CALIFORNIA'S PACK OF CANNED TUNA FOR JANUARY-JULY 1958 AT RECORD HIGH:** The total California tuna cannery case pack January-July 1958 of 6.3 million standard cases set a new high for any comparable preceding 7-month period. This was 350,000 standard cases or 6 percent above the previous 7-month record high of 5.9 million cases in 1956. In January-July 1957 only 5.5 million cases were packed.

Principal factors accounting for a new high in the California canned tuna pack this year through July 31 were record tuna purse-seine catches and record-high frozen tuna imports.

The increase in the case yield--from 46.5 cases per ton of tuna for the first seven months of 1957 to 49.5 cases per ton for January-July 1958--was due to the fact that a larger percentage of the imports consist of gilled and gutted yellowfin tuna and the greater proportion of the pack consists of chunk-style.

### United States Fishing Fleet<sup>1/</sup> Additions

**APRIL 1958:** A total of 58 vessels of 5 net tons and over were issued first documents as fishing craft during April 1958--13 more than during April 1957. The

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft, by Areas, April 1958 with Comparisons

Area	April		Jan.-April		Total
	1958	1957	1958	1957	1957
	(Number)				
New England . . . . .	4	3	7	6	19
Middle Atlantic . . . . .	-	2	3	12	23
Chesapeake . . . . .	6	9	30	31	104
South Atlantic . . . . .	5	9	37	28	130
Gulf . . . . .	28	13	89	35	166
Pacific . . . . .	10	5	28	19	102
Great Lakes . . . . .	-	2	2	2	8
Alaska . . . . .	5	2	8	10	48
Puerto Rico . . . . .	-	-	-	-	1
Virgin Islands . . . . .	-	-	1	-	-
Total . . . . .	58	45	205	143	601

Note: Vessels assigned to the various sections on the basis of their home ports.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft, by Tonnage, April 1958

Net Tons	Number
5 to 9 . . . . .	21
10 to 19 . . . . .	11
20 to 29 . . . . .	5
30 to 39 . . . . .	8
40 to 49 . . . . .	11
50 to 59 . . . . .	1
90 to 99 . . . . .	1
Total . . . . .	58

Gulf area led all others with 28 vessels, followed by the Pacific with 10, the Chesapeake area 6, the

South Atlantic and Alaska areas 5 each, and the New England area with 4.

**MAY 1958:** During May 1958, 80 vessels of 5 net tons and over were issued first documents as fishing craft. Compared with the same month of 1957, this was an increase of 14 vessels. The Gulf States continued to lead with 27 vessels, the Pacific area was second with 17 vessels, and the South Atlantic third with 14 vessels.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft, by Areas, May 1958 with Comparisons

Area	May		Jan.-May		Total
	1958	1957 <sup>1/</sup>	1958 <sup>1/</sup>	1957 <sup>1/</sup>	1957
	(Number)				
New England . . . . .	1	3	8	9	19
Middle Atlantic . . . . .	4	-	7	12	23
Chesapeake . . . . .	7	8	38	39	104
South Atlantic . . . . .	14	8	51	36	130
Gulf . . . . .	27	8	117	43	166
Pacific . . . . .	17	26	46	45	102
Great Lakes . . . . .	1	1	3	3	8
Alaska . . . . .	9	12	17	22	48
Puerto Rico . . . . .	-	-	-	-	1
Virgin Islands . . . . .	-	-	1	-	-
Total . . . . .	80	66	288	209	601

<sup>1/</sup>Revised.

Note: Vessel assigned to the various sections on the basis of their home ports.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft, by Tonnage, May 1958

Net Tons	Number
5 to 9 . . . . .	24
10 to 19 . . . . .	17
20 to 29 . . . . .	14
30 to 39 . . . . .	16
40 to 49 . . . . .	6
50 to 59 . . . . .	1
180 to 189 . . . . .	1
190 to 199 . . . . .	1
Total . . . . .	80

Fishing craft that were issued first documents as fishing craft during the first five months of 1958 totaled

288 vessels--an increase of 79 vessels as compared with the same period of 1957.

<sup>1/</sup>Includes both commercial and sport fishing craft.

Of the vessels documented for fishing, 41 percent were reported from the Gulf States.

**JUNE 1958:** During June 1958, 76 vessels of 5 net tons and over were issued first documents as fishing craft. Compared with the same month of 1957, this was a decrease of one vessel. The Gulf States continued to lead with 32 vessels, the Pacific area was second with 20 vessels, and the South Atlantic third with 10 vessels.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft, by Areas, June 1958 with Comparisons

Area	June		Jan.-June		Total
	1958	1957	1958 <sup>1/</sup>	1957 <sup>1/</sup>	
	(Number)				
New England . . .	2	2	10	11	19
Middle Atlantic . .	-	1	7	13	23
Chesapeake . . . .	6	12	44	51	104
South Atlantic . . .	10	19	61	55	130
Gulf . . . . .	32	18	149	61	166
Pacific . . . . .	20	19	66	64	102
Great Lakes . . . .	-	1	3	4	8
Alaska . . . . .	6	5	23	27	48
Puerto Rico . . . .	-	-	-	-	1
Virgin Islands . . .	-	-	1	-	-
Total . . . . .	76	77	364	286	601

<sup>1/</sup> Revised.

Note: Vessels assigned to the various sections on the basis of their home ports.

364 vessels--an increase of 78 vessels as compared with the same period of 1957. Of the vessels documented for fishing, 41 percent were reported from the Gulf States.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft, by Tonnage, June 1958

Net Tons	Number
5 to 9 . . . .	25
10 to 19 . . . .	11
20 to 29 . . . .	11
30 to 39 . . . .	19
40 to 49 . . . .	8
50 to 59 . . . .	1
210 to 219 . . . .	1
Total . . . . .	76

Fishing craft that were issued first documents as fishing craft during the first six months of 1958 totaled



## United States Fishery Landings

**DOWN 11 PERCENT DURING FIRST SEVEN MONTHS OF 1958:** Landings of fish and shellfish in the United States and Alaska during the first seven months of 1958 dropped 11 percent as compared with the same period last year. Fisheries which produced 1.8 billion pounds from January to July 1958, yielded almost 2.1 billion pounds from January to July 1957.

Menhaden, with landings of 701 million pounds, showed the greatest decline--132 million pounds less than in the same months of 1957. Increased menhaden landings in the Gulf States and in Virginia were more than offset by sharply reduced production in the Middle Atlantic and New England States. On the Pacific Coast, anchovies were down 31 million pounds and the catch of jack mackerel was off 29 million pounds. Maine herring was down 23 million pounds. Herring landings in Alaska were off 33 million pounds. Whiting receipts in Maine, and at Boston and Gloucester, Mass., were 35 million pounds this year as compared with over 55 million pounds for the same period in 1957.

Ocean perch in New England was up 17 million pounds over the similar 1957 period. Fish for industrial use in New England was likewise taken in greater volume--66 million pounds--up 8 million pounds. The catch of salmon in Alaska to August 10 was 38 million pounds greater than the 151 million pounds taken during this period in 1957.



United States Fishery Landings of Certain Species for Periods Indicated, 1958 and 1957 1/					United States Fishery Landings by States for Periods Indicated, 1958 and 1957 1/				
Item	Period	1958	1957	Total 1957	Item	Period	1958	1957	Total 1957
..... (1,000 Lbs.).....					..... (1,000 Lbs.).....				
Anchovies, Calif.	6 mos.	4,536	35,850	38,650	Maine .....	6 mos.	89,213	105,048	290,528
<u>Cod:</u>					<u>Massachusetts:</u>				
Maine .....	6 mos.	1,987	1,587	2,032	Boston ....	7 mos.	81,851	91,271	135,072
Boston .....	7 "	9,782	12,363	17,487	Gloucester ..	7 "	112,433	141,905	248,928
Gloucester ..	7 "	1,842	1,167	2,020	New Bedford	7 "	68,391	50,357	104,334
Total cod ..		13,611	15,117	21,539	Provincetown	7 "	10,055	13,594	25,109
<u>Haddock:</u>					Total Mass.		272,730	297,127	513,443
Maine .....	6 mos.	2,407	2,516	4,097	Rhode Island 2/	5 mos.	37,868	48,394	121,273
Boston .....	7 "	58,133	59,214	93,617	New York 2/-	6 "	21,274	23,021	40,223
Gloucester ..	7 "	7,399	6,474	8,898	New Jersey 2/	6 "	23,767	28,629	50,541
Total haddock		67,939	68,204	106,612	North Carolina 2/	6 "	32,142	30,590	64,634
<u>Halibut 2/:</u>					South Carolina 2/	6 "	4,701	4,177	24,316
Washington ..	7 mos.	12,142	11,399	20,733	Georgia ....	6 "	5,724	6,169	18,584
Alaska .....	7 "	15,421	17,330	15,430	Florida 2/...	6 "	71,943	65,905	140,698
Total halibut		27,563	28,729	36,163	Alabama ....	4 "	2,008	2,647	11,882
<u>Herring:</u>					Mississippi 2/	5 "	3,751	5,787	19,991
Maine .....	6 mos.	23,926	47,100	153,621	Louisiana 2/..	1 "	2,551	2,994	63,322
Alaska .....	7 "	71,880	105,204	118,300	Texas 2/....	3 "	8,720	10,972	77,156
Industrial fish,					Ohio (Mar.-June)	6 "	11,887	18,919	22,844
Maine & Mass. 3/	7 mos.	66,494	58,162	112,446	Oregon .....	5 "	18,003	17,921	56,680
<u>Mackerel:</u>					Washington ..	6 "	58,912	49,609	142,576
Jack .....	6 mos.	6,524	35,772	86,300	<u>California:</u>				
Pacific .....	6 "	10,578	8,410	55,200	Certain species 3/	6 mos.	162,380	226,552	496,748
Menhaden ....	7 mos.	701,123	832,741	1,683,143	Other .....	4 "	32,182	34,791	127,250
<u>Ocean perch:</u>					Total California		194,562	261,343	623,998
Maine .....	6 mos.	36,694	28,393	64,723	Rhode Island, Middle				
Boston .....	7 "	1,399	2,320	3,819	Atlantic, Chesapeake,				
Gloucester...	7 "	44,730	34,993	65,389	South Atlantic, and				
Total ocean perch		82,823	65,706	133,931	Gulf States,				
<u>Salmon:</u>					(menhaden only)	7 mos.	700,267	817,927	1,661,480
Washington ..	6 mos.	2,889	4,420	43,000	<u>Alaska:</u>				
Oregon .....	5 "	1,651	1,396	11,354	Halibut 4/...	7 mos.	15,421	17,330	20,733
Alaska .....	to Aug. 10	188,807	150,998	194,712	Herring ....	7 "	71,880	105,204	118,300
Scallops, sea, New					Salmon ....	to Aug. 10	188,807	150,998	194,712
Bedford .....	7 mos.	8,753	9,429	16,461	Total all above items		1,836,131	2,070,701	4,277,894
Shrimp (heads-on)					Other		5/	5/	472,106
South Atlantic and					Grand Total		5/	5/	4,750,000
Gulf States ..	4 mos.	32,453	33,679	166,737					
Squid, Calif. ..	6 "	3,050	5,602	10,758	1/Preliminary.				
Tuna, Calif. ..	6 "	137,692	140,918	386,724	2/Excludes menhaden landings.				
<u>Whiting:</u>					3/Includes catch of: Anchovies, jack and Pacific mackerel,				
Maine .....	6 mos.	8,048	7,610	15,810	tuna, and squid.				
Boston .....	7 "	205	879	1,002	4/Dressed weight.				
Gloucester ..	7 "	26,619	46,060	76,521	5/Data not available.				
Total whiting		34,872	54,549	93,333					
Total all above items		1,487,164	1,701,986	3,468,984					
Others (not listed)		348,967	368,715	1,281,016					
Grand Total		1,836,131	2,070,701	4,750,000					
1/Preliminary. 2/Dressed weight. 3/Excluding menhaden.									





### U. S. Fish Stick Production

**APRIL-JUNE 1958:** The United States production of fish sticks during the second quarter of 1958 totaled 13.8 million pounds, an increase of 2.6 million pounds (or 23 percent) as compared with the second quarter of 1957. The peak month of the 1958 second

quarter was April when 4.9 million pounds were reported, June was the second highest month with 4.7 million pounds, while during May 4.2 million pounds were reported.

Table 1 - U. S. Production of Fish Sticks, April-June 1958<sup>1/</sup>

Month	Cooked	Uncooked	Total
	(1,000 Lbs.)		
April . . . . .	4,345	511	4,856
May . . . . .	3,718	511	4,229
June . . . . .	4,220	483	4,703
Total 2nd Quarter 1958 . . . .	12,283	1,505	13,788
Total 2nd Quarter 1957 . . . .	10,113	1,108	11,221
Total First 6 Months 1958 . .	27,929	2,796	30,725
Total First 6 Months 1957 . .	23,284	2,420	25,704

<sup>1/</sup>Preliminary.

The Atlantic Coast States led all other areas with 11.4 million pounds (or 83 percent) of the total production. The Inland, Gulf Coast States, and the Pacific Coast States accounted for the remaining 17 percent.

Table 2 - U. S. Production of Fish Sticks, by Areas, April-June 1958 and 1957

Area	1958 <sup>1/</sup>		1957 <sup>2/</sup>	
	Number of Firms	1,000 Lbs.	Number of Firms	1,000 Lbs.
Atlantic Coast States . . . . .	24	11,449	25	9,355
Inland and Gulf States . . . . .	4	1,178	5	956
Pacific Coast States . . . . .	11	1,161	11	910
Total . . . . .	39	13,788	41	11,221

<sup>1/</sup>Preliminary.

<sup>2/</sup>Revised.

During the first six months of 1958, a total of 30.7 million pounds of fish sticks was produced--an increase of 5.0 million pounds over the same period of 1957. Cooked fish sticks were up 4.6 million pounds, while the production of uncooked fish sticks was up 376,000 pounds.



### United States Commercial Fisheries Gear

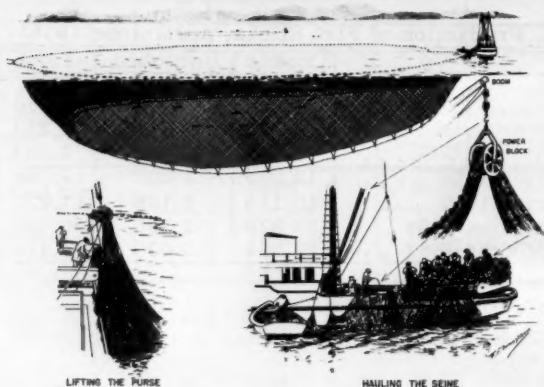
Nearly 14 million fish hooks of assorted sizes, and more than 1 million crab, lobster, and spiny lobster pots of varied design, are part of the fish gear used to capture the fish and shellfish for the United States consumer.

But despite these imposing numbers, only about 11 percent of the annual fish harvest is taken by these types of gear, U. S. Bureau of Commercial Fisheries records show. It is the purse seine and the otter trawl which not only bring in the largest catch of food fish but of industrial fish as well.

The 14 million hooks may be utilized at the rate of a fourth of a hook to a line, as in the case of some tuna fishing when it takes four lines, four poles, four men--and one hook--to bring in the big ones; or there may be as many as a thousand hooks on an attached series of lines in the fisheries that use the long-line gear. In many more instances the use of a single line and hook by one fisherman does the work satisfactorily in making catches of grouper, snapper, and tuna.

Bureau records show that the various hook-and-line combinations in recent years caught more than 450 million pounds of fish a year. The catch with pots has been averaging about 120 to 130 million pounds a year. The total annual harvest of all fish and shellfish for the last few years has approximated 5 billion pounds, sometimes a bit higher, sometimes lower.

#### SALMON PURSE SEINING



About 2,400 purse seines (which are used to encircle the schools of pelagic fish) catch about 2.4 billion pounds of fish annually, or nearly half the total harvest. Much of the catch consists of menhaden, but there is included in the total large amounts of salmon, tuna, mackerel, and Pacific sardines.

Over the bottom to capture many bottom-dwelling species) catch about 1 billion pounds annually, or 20 percent of the catch. The otter trawl brings in cod, haddock, ocean perch, flat fishes, whiting, and shrimp. There were more than 9,000 trawls in operation during 1957.

An average of 28,000 gill nets are responsible for 4 percent of the catch; 3,300 pound nets, which include fish traps, take 3-4 percent. Shellfish dredges bring in an average of about 100 million pounds of clams (meats), crabs, oysters (meats), and scallop (meats); the balance is divided between "stop" seines (used to cut off the retreat of fish entering coves), haul seines, and miscellaneous gear.

#### U. S. Foreign Trade

**GROUND FISH FILLET IMPORTS, JULY 1958:** Imports of cod, haddock, hake, pollock, cusk, and ocean perch fillets (including blocks) into the United States during July 1958 totaled 19.7 million pounds. Compared with the corresponding month of 1957, this was an increase of 4.2 million pounds. Canada continued to lead all other countries as supplier with 15.1 million pounds, or 77 percent of the month's total imports.

During the first seven months of 1958, these imports amounted to 86.2 million pounds--4.4 million pounds above the quantity imported during the same period of 1957. Imports from Canada represented 71 percent of the total. Iceland accounted for 23 percent, and the remaining 6 percent was comprised of imports from nine other countries.



The quota of groundfish and ocean perch fillets and blocks permitted to enter the United States at 1½ cents per pound in the calendar year 1958 is 35,892,221 pounds, based on a quarterly quota of 8,973,055 pounds. The quota for the calendar year 1957 amounted to 37,375,636 pounds. Imports during individual quarters in excess of the established quarterly quota enter at a duty of 2½ cents a pound.

Note: See Chart 7 in this issue

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**IMPORTS AND EXPORTS OF SELECTED FISHERY PRODUCTS, JANUARY-MAY 1958:** Imports: **GROUND-FISH FILLETS AND BLOCKS:** Imports of cod, haddock, hake, pollock, cusk, and ocean perch fillets and blocks during January-May were about equal to the quantity imported during the corresponding period of 1957. Principal increases in imports of blocks or slabs and cod fillets from Iceland and Denmark were counterbalanced by declines in blocks or slabs and haddock fillets from Canada and ocean perch from Iceland.

A new groundfish product, "fish bits," has recently entered the United States in substantial quantity. This product consists of bits of fish derived from trimming fillets and the backbone of the fish after filleting. These bits are assembled and frozen into blocks (generally about 7 pounds) primarily for use in the preparation of fish flakes. By a ruling of the Customs Court at New York on June 4, 1957 (*Treasury Decisions*, June 13, 1957, Abstract No. 60817), such products were determined dutiable at one cent a pound, classified under Tariff paragraph 720(b), "fish, prepared or preserved, n.s.p.f." As a result, imports of "fish bits" are not included under the "groundfish fillet and block" classification.

**FROZEN TUNA:** Total imports through May this year were about 1 percent below those of the first five months of 1957. Frozen albacore imports were 25 percent less, but yellowfin and skipjack 17 percent greater. Receipts of yellowfin and skipjack from Peru declined by 8 million pounds, but those from Japan increased by 13 million pounds.

**TUNA LOINS AND DISCS:** In May 1958 practically no imports direct from Japan were recorded because of voluntary restrictive measures adopted by the Japanese. A gain was reported in receipts through Cuba as a result of Japanese operations in the South Atlantic. January-May 1958 imports of cooked tuna loins and discs were about half those of the first five months of 1957.

**CANNED TUNA:** During January-May 1958, canned tuna imports were 3 percent below those of the same 1957 period. Receipts of canned albacore or white-meat tuna were down 30 percent; canned light-meat tuna increased 12 percent.

**CANNED BONITO:** Imports from Peru in the first five months this year were 24 percent less than in the similar period last year.

**FRESH OR FROZEN LOBSTERS:** Imports this year January-May were 9 percent less than during January to May of 1957; principal decreases were in receipts from Mexico, Cuba, Australia, and New Zealand.

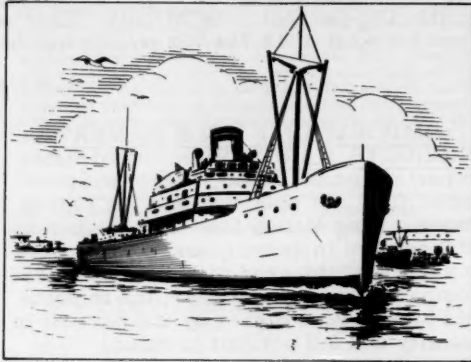
**SHRIMP:** Gains in shipments from Hong Kong and many sources in Central and South American countries primarily accounted for the 11 percent increase in shrimp imports the first five months of 1958. Receipts from Panama and Japan were less than in the same period of 1957.

**CANNED OYSTERS:** Receipts during January-May 1958 registered large gains, particularly from Japan. Quantities received were about double those imported in the comparable period of 1957.

**CANNED SARDINES:** Imports of canned sardines in oil January-May 1958 were 16 percent less than during the first five months of 1957. Imports of sardines, not in oil, were about six times those of the corresponding 1957 period, primarily the result of large gains in shipments from the Union of South Africa.

Reports indicate that in 1958 the South African pilchard canning industry will have the best season since the rec-

ord catch of 1952. After six years of reduced catches, the fish returned in abundance early in February and subsequent catches have been good. The April catch set a new record. Fish were reported within a few miles of the coast. Large quantities of jack mackerel were also available. According to reports, improved fishing was matched by greater sales to export markets, principally to the Philippines and other Far East countries.



**CANNED SALMON:** Increased shipments from both Japan and Canada have raised the imports for January-May 1958 to 160 percent of a year ago. In Japan, a substantial carryover of canned salmon from the 1957 pack was reported on hand early this year, but mid-year reports indicate it has been sold.

**CANNED CRABMEAT:** Imports during the first five months this year were about 12 percent below those of a year ago.

**FISH MEAL:** Imports during January-May 1958 were 17 percent above a year ago. Receipts from Canada declined to less than half those in the similar 1957 period, but large increases occurred in imports from Angola, Peru, Chile, and the Union of South Africa. Heavy catches of pilchards and mackerel in South Africa have resulted in increased exports of fish meal from South Africa to Great Britain, Western Europe, and the United States.

**Exports: CANNED SARDINES, MACKEREL, AND ANCHOVIES:** Compared to the first five months of 1957, exports during January-May 1958 of canned California sardines declined 64 percent; canned mackerel, 82 percent; and canned anchovies, about 89 percent. Major reductions in the domestic catch resulted in reduced exports of these products to established markets in Cuba, other Latin American countries, and the Philippines.

**CANNED SALMON:** Canned salmon exports during January-May 1958 were 51 percent less than for the similar period of 1957.

**FISH OIL:** Sharp declines were noted in shipments to Western Germany and the Netherlands; exports to Canada increased. Total exports of fish oil during the first five months of 1958 were 45 percent less than during the same period a year ago. Because of the large catches of pilchard and mackerel, South Africa's output of fish body oils and exports to Europe have increased. This probably has had an effect upon sales and exports of United States fish oils.

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**IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:** The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1958 at the 12½-percent rate of duty has been established as 44,693,874 pounds.

Any imports in excess of this established quota will be dutiable at 25 percent ad valorem.

Imports from January 1-July 5, 1958, amounted to 20,407,245 pounds, according to data compiled by the Bureau of Customs. This leaves a balance of 24,286,629 pounds of the quota which may be imported during the balance of 1958 at the 12½-percent rate of duty. Last year from January 1-June 1 a total of 17,764,752 pounds had been imported.



\* \* \* \* \*

**IMPORTS OF EDIBLE FISHERY PRODUCTS, MARCH 1958:** United States imports of edible fresh, frozen, and processed fish and shellfish into the United States during March 1958 were higher by 10.0 percent in quantity and 20.2 percent in value as compared with February 1958. Compared with March 1957, the imports this March were higher by 1.0 percent in quantity and 8.9 percent in value.

United States Imports of Edible Fishery Products, March 1958 With Comparisons						
Item	Quantity			Value		
	Mar.		Year	Mar.		Year
	1958	1957	1957	1958	1957	1957
	(Millions of Lbs.)			(Millions of \$)		
Fish & shellfish:						
Fresh, frozen, & processed 1/...	68.5	67.8	837.0	22.0	20.2	248.4

1/Includes pastes, sauces, clam chowder and juice, and other specialties.

\* \* \* \* \*

Table 1—United States Imports of Edible Fishery Products, April 1958 with Comparisons

Item	Quantity			Value		
	Apr.		Year	Apr.		Year
	1958	1957	1957	1958	1957	1957
	(Millions of Lbs.)			(Millions of \$)		
Fish & shellfish:						
Fresh, frozen, & processed 1/...	66.0	62.6	837.0	19.5	17.2	248.4

1/Includes pastes, sauces, clam chowder and juice, and other specialties.

**IMPORTS OF EDIBLE FISHERY PRODUCTS, APRIL 1958:** Imports of edible fresh, frozen, and processed fish and shellfish into the United States during April 1958 were down 3.7 percent in quantity and 11.3 percent in value as compared with March 1958.

Compared with April 1957, the imports this April were higher by 5.4 percent in quantity and 13.4 percent in value.

### Wholesale Prices, July 1958

The July edible fish and shellfish wholesale price index, although slightly lower, was still very close to the June record peak when it was the highest for any month since January 1947, the beginning of the 1947-49 base period for the index. Although there were some price declines for fresh and frozen processed fishery products, they were almost completely offset by the higher ex-vessel prices for fresh unprocessed fish because of continued light landings. The July edible fish and shellfish (fresh, frozen, and canned) wholesale price index (131.2 percent of the 1947-49 average) dropped only 0.2 percent from the previous month's record high level, but was 9.4 percent higher than for the same month of 1957.

Continued light landings, particularly in the New England and Middle Atlantic area, were responsible for the record high prices in July for drawn, dressed, and whole finfish. During the summer prices are generally low because landings are usually heavy. Increases in ex-vessel prices for fresh large drawn haddock at Boston (up 8.2 percent) and wholesale prices for fresh large and medium king salmon and yellow pike (up 27.2 percent) at New York City more than offset a substantial drop in whitefish wholesale prices at New York City. Compared with July 1957, this July's prices were up for fresh large haddock by 38.1



Iced domestic and Canadian fresh-water fish stacked up inside a wholesale fish house in the Chicago Fulton Market area.



percent, for fresh Western halibut by 8.1 percent, for fresh king salmon by 20.4 percent, and for whitefish by about 13.7 percent. The drawn, dressed, or whole finfish subgroup index this July was 2.6 percent higher than the previous month and 23.3 percent above July 1957.

The light haddock landings were reflected in higher prices this July for fresh haddock fillets at Boston—up 8.2 percent from the previous month and 33.9 percent from the same month in 1957. The increase in fresh haddock fillets and shucked oyster prices was more than offset by a drop of 4.3 percent in July's fresh shrimp prices at New York. Compared with July 1957, prices this July for fresh haddock fillets were up 33.9 percent and for fresh large shrimp were up 4.2 percent. The index for the fresh processed fish and shellfish subgroup dropped 1.3 percent from June to July but was 5.4 percent higher than in the same month of 1957.

A drop in the prices for frozen shrimp at Chicago of 4.5 percent and for frozen ocean perch fillets more than offset

a 3.1-percent rise in the prices of frozen haddock fillets from June to July. Compared to July a year ago, prices this July for frozen haddock fillets were 26.4 percent higher and for frozen ocean perch fillets were 5.5 percent higher. On the other hand, frozen shrimp prices were 2.8 percent lower and flounder fillets also slightly lower. The July index for the processed frozen fish and shellfish subgroup was 2.4 percent lower than the previous month, but 5.7 percent higher than in the same month a year ago.

There was only a slight drop in the prices of canned fishery products from June to July because of slightly lower prices for California sardines (as dealers started to clean up their stocks for the beginning of the new season) and slightly lower prices for Maine sardines. When compared with a year ago, this July's prices for canned tuna were up 4.0 percent, for California sardine up 25.0 percent, and for Maine sardines were up 3.7 percent. This July's canned fishery products subgroup index was almost the same as a month earlier, but 3.8 percent higher than in July 1957.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, July 1958 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices <sup>1/</sup> (\$)		Indexes (1947-49=100)			
			July 1958	June 1958	July 1958	June 1958	May 1958	July 1957
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned) . . . . .					131.2	131.5	128.6	119.9
Fresh & Frozen Fishery Products: . . . . .					150.0	150.4	146.0	133.3
Drawn, Dressed, or Whole Finfish: . . . . .					151.0	147.2	148.3	122.5
Haddock, lge., offshore, drawn, fresh . . . . .	Boston	lb.	.13	.12	131.6	121.6	101.7	95.3
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.40	.40	123.8	123.8	106.7	114.5
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.75	.75	169.1	168.5	179.8	140.5
Whitefish, L. Superior, drawn, fresh . . . . .	Chicago	lb.	.54	.54	132.6	132.6	190.9	130.2
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.63	.70	126.4	141.6	202.2	111.2
Yellow pike, L. Michigan & Huron, rnd., fresh .	New York	lb.	.70	.55	164.1	129.0	111.4	164.1
Processed, Fresh (Fish & Shellfish): . . . . .					149.4	151.3	142.7	141.7
Fillets, haddock, sml., skins on, 20-lb. tins . .	Boston	lb.	.40	.37	134.4	124.2	122.5	100.4
Shrimp, lge. (26-30 count), headless, fresh . .	New York	lb.	.99	1.04	156.4	163.5	150.1	150.1
Oysters, shucked, standards . . . . .	Norfolk	gal.	5.75	5.63	142.3	139.2	136.1	142.3
Processed, Frozen (Fish & Shellfish): . . . . .					136.3	139.7	134.1	129.0
Fillets: Flounder, skinless, 1-lb. pkg. . . . .	Boston	lb.	.40	.40	103.4	103.4	103.4	102.1
Haddock, sml., skins on, 1-lb. pkg. . . . .	Boston	lb.	.34	.33	105.2	102.0	106.7	83.2
Ocean perch, skins on, 1-lb. pkg. . . . .	Boston	lb.	.29	.29	114.8	116.8	118.8	108.8
Shrimp, lge. (26-30 count), 5-lb. pkg. . . . .	Chicago	lb.	.94	.99	145.1	152.0	140.0	149.3
Canned Fishery Products: . . . . .					104.6	104.7	104.3	100.8
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. . .	Seattle	cs.	23.00	23.00	120.0	120.0	120.0	120.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs. . . . .	Los Angeles	cs.	11.65	11.65	84.0	84.0	84.0	80.8
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 24 cans/cs. . . . .	Los Angeles	cs.	5.63	5.68	131.3	132.4	132.4	105.0
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs. . . . .	New York	cs.	7.72	7.75	82.2	82.5	79.8	79.3

<sup>1/</sup> Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.







# FOREIGN

## International

### FOOD AND AGRICULTURE ORGANIZATION

#### NAVAL ARCHITECT REPORTS ON WORLD MARKETS FOR AND DESIGN OF FISHING BOATS AND ENGINES:

The "engine barrier" which existed among fishermen in the underdeveloped countries has been broken down, reported the Chief Naval Architect, Fisheries Division, Food and Agriculture Organization (FAO), Rome, Italy, on his return from an 80-day round-the-world trip. The purpose of the trip was to discuss with government officials and private individuals in various countries participation in the second World Fishing Boat Congress, which will be held at FAO headquarters, Rome, April 5 to 10, 1959.



**Fishermen Eager to Mechanize Boats:** "I was impressed by the developments in mechanization which are taking place in the underdeveloped countries of the Far East," he said. "It is quite clear that the fishermen now are convinced of the value of mechanization which enables them to catch 3 or 4 times more fish... but there is the problem of finding ways and means to supply the engines required by the fishermen. However, that is chiefly an economic problem, especially as it is often closely tied up with a system of government subsidies.

"Apart from this aspect, the main question now seems to be the introduction of an extension service which will help overcome the difficulties arising from lack of communication between fishing villages. It is surprising to realize that the news of the successful introduction of mechanized fishing craft in a village does not spread along the coast. The next village, perhaps 20 or 30 miles away, will hear nothing of it, chiefly because there is no road communication."

**Fisheries Departments Stimulating Production:** A very noticeable change in the attitudes of governments towards fisheries has taken place, according to the Chief Naval Architect. Until recently fisheries departments seemed to approach fishery development work from the scientific and biological point of view and were mostly concerned with introducing fishing regulations. But now the fisheries departments are trying to stimulate production through the introduction of modern motors, mechanized gear, synthetic fibre nets, and so on.

**Great Savings in Fuel Costs Possible:** While in Japan the FAO Chief Naval Architect conferred with scientists of the Fisheries Agency, Tokyo, where FAO-sponsored tests of fishing vessel models are being carried out in the Agency's tank. "We have, for a long time past, been advocating the construction of fishing vessels with a low prismatic coefficient, because the results of tests sponsored by FAO have shown that such vessels would cut fuel costs by at least 15 percent while operating in calm water conditions," he stated.

A boat with a low prismatic coefficient has a hull designed to concentrate the main volume of water displacement around midships, he explained, but a boat with a high prismatic coefficient has a hull designed to carry the displacement of water more evenly along its whole length.

The tests in the Tokyo tank have been made in rough water conditions, and these have shown some remarkable results. In fact, the data obtained so far indicate that a traditional hull requires about 60 percent more fuel in rough water conditions than a fishing boat with a low prismatic coefficient. Such a saving could be effected by all fishing vessels of 30 to 200 feet.

The effect of the prismatic coefficient was dramatically illustrated in the Tokyo tank during tests when a model with a high prismatic coefficient was so heavy in its movements in rough water that it broke the testing instruments. There are at least two other advantages in designing fishing boats with a low prismatic coefficient. The first is that such boats will be seakindlier, which means that they will provide much pleasanter conditions for the crew. The second is that they will be able to continue fishing in rougher water and higher wind force than is possible in the usual type of fishing boat of today.

**Enclosed Working Deck for Long-Liners:** In the course of his trip the FAO Architect visited the United States, Canada, and Newfoundland. While in Newfoundland he advised on the construction of some 30 long-liners.

"It had been proposed to build boats with the line-hauling operation on the open deck," he explained, "but I suggested a design to provide a completely enclosed working deck which would enable the crew to bait, set, and handle the fishing lines under cover and also split the catch. I proposed that the accommodation throughout should be heated by infrared rays. The Newfoundland naval architects are now working on this design and 20 boats of 60-70 feet and 10 boats of 80-100 feet will be constructed at a cost of about \$1,600,000."

### (NORTH EUROPEAN) INTERNATIONAL FISHERIES CONVENTION

#### PERMANENT COMMISSION TO MEET IN DUBLIN:

A British Ministry of Agriculture, Fisheries and Food spokesman confirmed recently the news from Oslo that the Permanent Commission of the International Fisheries Convention of 1946 would hold their regular meeting in Dublin in November 1958, to discuss, among other things, the draft of a new convention.

The meeting is of prime importance because the Soviet Union joined the convention recently and so will take part in a meeting of the Permanent Commission for the first time. The Commission comprises representatives of all the 14 member countries.

The Commission regulates fishing in the Arctic and North Atlantic from the

## International (Contd.):

coast of Labrador to the western parts of the Barents Sea. The Baltic is, however, excluded from the convention area. Moreover, all Soviet sea areas are similarly exempted.

Note: Also see Commercial Fisheries Review, August 1958, p. 57.

## INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

## PROSPECTS FOR 1958 RUN OF FRASER RIVER SOCKEYE:

The Early Stuart run, which has provided the entire catch of sockeye to date, is later than any previously recorded Early Stuart run. Catches in the Fraser River indicate that the peak is now appearing--at least a week later than normal, a July 16, 1958, "Information Bulletin" of the International Pacific Salmon Fisheries Commission points out.

Ocean temperatures are at a record high, and the Fraser sockeye may have moved further north than normal during their marine existence. Reports on other species indicate that a northern shift in ocean habitat has taken place during the current season.

A careful analysis, based on several factors, indicate that the size of the Early Stuart run is in accordance with pre-season anticipations. The 1958 runs up to July 20 were not expected to equal those of the brood cycle for the same period in 1954. The four-year-old Stuart fish, unselected by the gill-net fishery, averaged 5.3 pounds from July 1-7 and 5.6 pounds from July 8-14 as compared with an average weight of 5.7 and 6.1 pounds, respectively, for the same aged fish during the same weekly periods for the cycle from 1918 through 1954. The fish, therefore, are averaging smaller than normal as was anticipated in advance of the season.

General information provides justification for reasonable optimism on the prospects of the 1958 run. The only change in the anticipated character of the 1958 Fraser sockeye run is the tardy appearance of the Early Stuart run. If the runs to come, including the important Adams River population, follow the late

migrating character of the Stuart run the catch will not follow the expected pattern established by the 1942 run.

## SEALING

## NORWEGIAN-U. S. S. R. NORTH ATLANTIC AGREEMENT RATIFIED:

The instruments of ratification of the Norwegian-Soviet agreement concerning sealing in the North Atlantic, signed in Oslo on November 22, 1957, were exchanged in Moscow on June 27, 1958, states a U. S. Embassy dispatch from Oslo dated July 2, 1958. The treaty became effective immediately.

Note: Also see Commercial Fisheries Review, February 1958, p. 50.

## TRADE AGREEMENTS

## U. S. S. R.-WEST GERMAN TRADE AGREEMENT INCLUDES FISH:

A Long-Term Trade and Payments Agreement between the German Federal Republic and the U. S. S. R. was signed on April 25, 1958. The agreement took effect retroactively as of January 1, 1958, and is in force until December 31, 1960.

Among the commodity quotas established for imports from the U. S. S. R. into the German Federal Republic are the following for fishery products: canned crabs DM4 million (US\$956,000) for 1958, DM4.5 million (US\$1,075,500) for 1959, and DM5 million (US\$1,195,000) for 1960; caviar and canned fish during 1958 at DM2.5 million (US\$597,500), and for 1959 and 1960 DM3 million (US\$717,000).

Note: Values converted at rate of DM1 equals US\$0.239.

## WHALING

## ANTARCTIC WHALE LIMIT FOR 1958/59 SEASON:

At a meeting of the International Whaling Commission in The Hague, Netherlands, June 23-27, 1958, it was decided to set the Antarctic pelagic whale catch limit for the 1958/59 season at 14,500 blue-whale units, the same as for the previous 2 seasons. This limit is subject to approval of the member countries. (Foreign Crops and Markets, vol. 77, no. 3.)



## Australia

### TUNA CATCH FOR 1958

#### SEASON SETS RECORD:

The South Australian tuna catch this season (now ended) totaled 545 metric tons. This compares with 230 tons in 1957 and 150 tons in 1956. The 545-ton catch was taken by two boats--Fairtuna and Tacoma. Fairtuna caught 335 tons, which was believed to be a record for one boat in Australia.

Adding the New South Wales catch of approximately 950 tons, gives a record Australian tuna catch of 1,495 tons.



## Belgium

### PROPOSED EXTENSION OF FISHING LIMITS BY ICELAND CREATES PROBLEMS:

The recent announcement by Iceland of the extension of its fishing limits to 12 miles, has caused speculation on the problems that will arise in relation to the Belgian fishing industry, states a July 16 dispatch from the United States Consulate in Antwerp. As a result of declining yields and rising operating expenses, two of the last three years have been particularly unprofitable for the fishing industry, and the Belgian fishing fleet has tended to depend increasingly on the more productive fishing grounds off the Icelandic coast.

The growing importance of these fishing grounds is illustrated by the percentage of the Belgian catch in 1957 which was landed from Iceland. The total Belgian landings in 1957 amounted to 109.3 million pounds valued at US\$9.8 million. Of this total, the landings from off Iceland amounted to 36.6 million pounds valued at US\$3.1 million or 33.5 percent of the total quantity landed and 23.4 percent of the total value. The total landings of whitefish (mainly cod and haddock) in 1957 amounted to 29.3 million pounds, of which 18.1 million pounds or 61.8 percent was caught off Iceland.

The fishing grounds around Iceland are very narrow except on the west and northeast side of the island. The north-

eastern fishing grounds are fished mainly by German trawlers. The western shores of Iceland are mainly fished by the Icelanders. The Belgians operate off the southeast coast between Ingolsholdi and the Vestmaens islands, where the continental shelf is extremely narrow and the bottom slopes rapidly into the oceanic depths.

Due to disappointing returns in the North Sea, medium-sized vessels of the Belgian fleet, designed for North Sea fishing, started several years ago to fish intensively on the Icelandic grounds. This proved successful and an increasing number of Belgian vessels engaged in fishing these waters. The smaller vessels met several difficulties not only because of the diminishing density of the fishing stocks further from the coast, but also because the bottom rapidly becomes too deep to be worked by less powerful vessels. In order to operate successfully, modifications of these vessels were required. Their hulls were strengthened and elongated and more powerful engines were installed at considerable cost to the Belgian owners. This fleet of medium-sized long-distance trawlers and some large steam trawlers developed into the most profitable part of the Belgian fishing fleet. For two of the last three years, these were the only vessels which not only covered their operating costs but returned profits to their owners. Due to their inability to operate in deeper waters, the medium-sized vessels will not be able to fish the Icelandic grounds once the boundaries are moved out further into the sea.

The finding of substitute fishing grounds is a problem. More distant fishing grounds, such as near Greenland and the Bear Island, have been previously explored without financial success. Only the largest vessels can work these grounds and the fish that have been caught there do not seem to be of the quality expected by the Belgian market. Other fishing grounds off East Iceland can perhaps provide a substitute, but it is uncertain that they can be fished by the smaller vessels of the Belgian fishing fleet. In addition, the species of fish most abundant there is the ocean perch. This species is comparatively unknown on the Belgian market and fishing industry

## Belgium (Contd.):

officials are not certain that it can be successfully sold.

Another problem which the Belgian industry foresees as a result of the Icelandic action is depletion of the North Sea grounds. It is anticipated that the greater part of the smaller trawlers now fishing the Icelandic grounds will swarm over to the North Sea. Since the maximum sustainable yield is being attained at present, it is believed that should this redeployment of the small vessels take place, the North Sea grounds will be overfished in a very short time.



## Canada

## FISH-VISCERAL FLOUR USED AS PROTEIN SUPPLEMENT FOR HOGS:

Fish-visceral flour, a new byproduct of the Canadian fishing industry, was found to be a satisfactory protein supplement in the rations of growing and finishing hogs, in tests at the Nappan, Nova Scotia, Experimental Farm, Canadian Department of Agriculture. The hogs had no objection to the fish-flour ration and their rate of gain, feed efficiency, and carcass grade were quite satisfactory.

The hogs used in the Nappan tests received a ration of barley, oats, and minerals, plus fish visceral flour at the rate of 10 percent by weight of the grain allowance, from weaning until the pigs reached a live weight of 100 pounds. At this point the fish flour was reduced to 4 percent of the grain mixture and kept at this level until the pigs reached the market weight of 200 pounds.

Fish flour was prepared by collecting fresh cod and haddock viscera on the vessels. Sodium nitrite, a preservative, was added to this material and the viscera kept at a temperature of 80° to 100° F., for several days. During this time most of the solids go into solution. The solution is then drum-dried and the dried material is ground into flour.

An estimated 90 million pounds of fish viscera are discarded annually in the Atlantic area. From this amount of viscera, approximately 18 million pounds of fish-visceral flour could be produced each year. The fish flour used in the tests was produced on an experimental basis by the Fisheries Technological Station, Halifax, N. S. Investigations on the use of this new feed are continuing at the Nappan Experimental Farm. (March 1958 Trade News of the Canadian Department of Fisheries.)

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## MARINE-OIL OUTPUT DROPS:

Marine-oil production in Canada in 1957 fell more than 40 percent below 1956, and probably will decline further in 1958. The drop resulted primarily from a smaller British Columbian herring catch, which in turn resulted from cold weather early in 1957, and a scarcity of fish. Also, a price disagreement between fishermen and processors curtailed fishing and processing.

The disagreement continued into 1958. Consequently there were no herring for processing and no oil produced in January and February. In the corresponding months of 1957 herring oil production totaled 4,950 short tons. On the Atlantic coast, however, herring oil output in January and February 1958 totaled 538 tons, compared with 117 tons in the first 2 months of 1957.

## Canada's Marine-Oil Production by Type and Major Producing Area, 1956-57

Area and Type of Oil	1957 <sup>1</sup>	1956
	(Short Tons)	
<u>Atlantic Coast:</u>		
Cod-liver oil . . . . .	3,689	4,347
Herring oil . . . . .	1,127	668
Other <sup>2</sup> . . . . .	2,560	1,826
Total Atlantic Coast	7,376	6,841
<u>British Columbia:</u>		
Herring oil . . . . .	9,224	21,284
Total . . . . .	16,600	28,125

<sup>1</sup>/Preliminary. <sup>2</sup>/Includes seal oil and other fish oils.

There has been a sharp change in the use of fish oils in Canada over the last several years. In 1956--the latest statistics available--all the fish oil used in Canada went into margarine and shortening manufacture. In 1955, only 14 tons of fish oil went into soap, whereas in 1948 about 800 tons--representing about 75 percent of all the marine oil used that year--were used for this purpose (Foreign Crops and Markets, July 7, 1958, U. S. Department of Agriculture).

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## HERRING RESEARCH IN NORTH PACIFIC:

Far out in the Pacific Ocean (up to 200 miles offshore) a single British Columbia research vessel fished for herring this summer. The Canadian Fisheries Research Board's A. P. Knight was scheduled to make two cruises of approximately one month each in July and August.

The objective was to determine the offshore limits and ocean distribution of herring spawned in British Columbia coastal waters and to study and appraise the mixture of their stocks.

Midwater trawl and drift nets were used in fishing wherever herring schools are located. The drift nets are designed to be set at varying depths ranging from



## Canada (Contd.):

the surface down to 50 fathoms. (May 1958 *Trade News* of the Canadian Department of Fisheries.)

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#### NEW CONTAINERS FOR SHIPPING LOBSTERS BY AIR DEVELOPED:

The distribution of live lobsters to markets across the continent has become a major phase of the Canadian lobster industry. For shipments within the Maritime Province and to the nearby New England States lobsters are often packed in simple wooden crates. These are transported by train or truck which are iced during warm weather. For greater distances lobsters are usually packed in double-walled boxes or barrels. In one type, 50 pounds of lobsters and about 10 pounds of seaweed are packed in the inside compartment. Forty or more pounds of flake ice are placed in the outside compartment. The gross shipping weight for 50 pounds of lobsters is often more than 125 pounds.

When lobsters are taken out of sea water they often weaken and die rather quickly. Even under good shipping conditions they cannot be expected to remain vigorous for more than a few days. Obviously the quality of lobsters reaching distant markets could be improved by faster transportation. Shipment by aircraft is a possible answer that could extend the live lobster trade to distant areas which cannot be supplied at present. The usual methods of packing are unsuitable for air transport because of excessive weight and leakage. There is a growing need for a light-weight, leakproof method of packing for air shipment.

A Canadian company has designed a double-walled, corrugated, cardboard box with an aluminum foil covering for insulation. Depending on holding temperatures, up to 20 pounds of ice are used to keep the lobsters cool. The ice is sealed in a polyethylene bag to protect the lobsters from melting ice and to avoid undesirable leakage. To improve insulation, the box is well sealed with tape but tests showed that two 1/2-inch air holes were necessary to prevent suffocation of the lobsters. When packed with 50 pounds of lobsters and 10 pounds of ice the container has a gross weight of 64 pounds.

On October 29, 1957, through the cooperation of Trans-Canada Airlines, a trial shipment of 250 pounds was trucked from St. Andrews, New Brunswick, to St. John, New Brunswick, and then flown to Montreal and return. During the 30-hour shipment temperatures inside the boxes averaged 43° F. at an average air temperature of 47° F. On completion of the return flight over 95 percent of the lobsters were found to be in excellent condition.

A radically different idea, packing lobsters in dry wood shavings, has been demonstrated by two lobster buyers from Belgium. Lobsters were allowed to drain for 15 minutes to remove excess water. Dry wood shavings were placed in the bottom of a cardboard box and a layer of lobsters was packed on top of the shavings. Wood shavings were added to cover the lobsters. This process was repeated until the box was filled. In all, three boxes were packed in this manner, each box containing 50 pounds of lobsters and 5 pounds of wood shavings. The boxes were not iced but they were kept cool at a room temperature of 50° F. The gross weight for 50 pounds of lobsters was only 57 pounds.

The lobster dealers who watched the demonstration felt that this was rather drastic treatment. However, the 150 pounds of lobsters were in surprisingly good condition with no sign of weakening after 2 days' storage. The potential value of this method of packing for air shipment was obvious.

To find out how long lobsters could be expected to live in wood shavings at different temperatures some tests were done at St. Andrews. Six boxes were packed with 20 pounds of lobsters, and about 4 pounds of shavings in each. As in the demonstration, the boxes were not iced but were stored at various room temperatures. One box was stored at 70° F., three boxes at 45° F. and two at 35° F. The temperature inside the boxes was 50° F. when packed.

To see if survival could be prolonged by icing, 5 pounds of ice sealed in a plastic bag was placed in each of four other boxes that were held at 70° F. In addition one fairly tight cardboard box was packed with 20 pounds of lobsters without wood shavings and without ice. Two small holes in the box prevented suffocation. This box was stored at 35° F.

The 11 boxes were examined periodically and the tests were stopped when it was certain that some lobsters were weakening.

These tests show that lobsters packed in wood shavings will remain in vigorous condition for reasonably long periods (up to 6 days) if they are stored at low temperatures. When held at 70° F. without ice, the temperature in the box increased rapidly and the lobsters were in poor condition by 24 hours. However, with 5 pounds of ice added, low temperatures were maintained for 24 hours and the lobsters remained in good condition. After that time the temperature began to rise and the lobsters were in poor condition at 48 hours.

In the tests at 35° F., lobsters packed without wood shavings remained vigorous for 5 days and those with shavings for 6 days, a slight difference considering the times involved.

The insulating quality of wood shavings is probably the most important feature of this method of packing. Small quantities of ice (5 pounds) will maintain low temperatures for 24 hours during warm weather. To extend the safe holding time beyond 24 hours more ice, more shavings, or more ice and shavings could be used. The effectiveness of these treatments has not been studied as yet.

A commercial shipment of 12,600 pounds of lobsters packed by a New Brunswick firm was flown from St. John, N. B., to Belgium during early December. Since air temperatures were low no ice was needed. Although they were shipped more than 3,000 miles, over 97 percent of the lobsters remained in excellent condition.

The possibility that air shipment will become a practical method of transportation for live lobsters on a continuing basis is approaching reality with the development of light-weight leakproof methods of packing. (*Trade News*, March 1958, of the Canadian Department of Fisheries.)

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#### NEWFOUNDLAND FISHERIES ACT IN FORCE:

The Fisheries Act is now in force in Newfoundland, the Canadian Minister of Fisheries announced earlier this year. A proclamation has been issued setting the date on which the Act became effective as May 1, 1958.

The fisheries in Newfoundland were previously administered under the Newfoundland statutes existing at the time of union in 1949 and which remained in force until the present time.

Proclamation of the Fisheries Act in Newfoundland will have the effect of bringing fisheries administration for all Canada under the basic statute relating to the management and regulation of the resource.

Since Confederation, Newfoundland fisheries regulations have been authorized under several old Newfoundland

## Canada (Contd.):

acts, such as the Department of Natural Resources Act, the Fish and Wildlife Act, the Fisheries Board Act, etc. This situation created many serious problems with respect to fisheries legislation. These problems are now resolved as a result of the proclamation.

The Fisheries Act is a comprehensive document, but essentially the main points covered are: the powers of the Minister and Fishery Officers; conservation and protection of various species of fish; authority for fisheries regulations, pollution, and obstruction of streams; and the licensing of fishing vessels and fishermen. (May 1958 Trade News of the Canadian Department of Fisheries.)

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SALMON RESEARCH IN  
NORTH PACIFIC, 1958:

Two fishing vessels, Key West 2 and Fort Ross, chartered by the Fisheries Research Board of Canada, have begun Canada's third Pacific Ocean survey, as part of the program of scientific research under the International North Pacific Fisheries Convention between Canada, United States, and Japan.

Both boats were fitted out at the Board's biological station at Nanaimo and will be cruising the high seas throughout the summer. While at sea the vessels will fish for salmon and other species to build up knowledge already gained on the racial characteristics and migratory patterns of salmon. Nine test fishing stations have been plotted and fishing operations will follow closely along lines established in 1956 and 1957. The Canadian vessels will be responsible for the area of the Pacific Ocean north of latitude 42 degrees and east of longitude 155 degrees. American and Japanese research teams will cover other parts of the North Pacific.

This year the Canadian vessels are carrying surface drift nets with mesh sizes varying up to a maximum of nine inches. Other drift nets will be set to fish at depths varying from the surface

to 200 feet under water. In addition both vessels will use midwater trawls when conditions warrant.

Fish will be kept in refrigerated storage holds. At the conclusion of the season's operations, specimens will be examined for fish-scale markings, parasites, stomach contents, feeding habits, and other factors that may have some bearing on the past history of the fish. Information and specimens will be pooled with the other countries concerned. Some tagging will be carried out when conditions are favorable. (May 1958 Trade News of the Canadian Department of Fisheries.)



## Ceylon

FISHING FLEET MECHANIZATION  
IMPROVES EARNINGS:

Mechanized fishing is becoming popular in most of the fishing centers around the island of Ceylon. After the Ceylonese Department of Fisheries, with the assistance of the Canadian Colombo Plan and Food and Agriculture Organization experts, gave a series of demonstrations to prove the efficiency of this method, many fishermen have purchased marine Diesel engines and outboard motors for use in their fishing boats. These have been obtained through the Department of Fisheries on easy repayment terms. The Department assists in their installation and also trains the fishermen in the proper use and maintenance of the new engines.

It is reported that fishermen who have started using mechanized boats have increased their income by being able to spend more time on the fishing grounds, reach them even at times when there is no wind, and return to the market when the price is normally at its highest.

Most of the fishermen have also adopted the use of more modern fishing methods, such as long lines and nylon drift nets (Trade News, Canada's Department of Fisheries, May 1958).



## Colombia

### FISHERY LANDINGS INCREASED CONSIDERABLY IN 1957:

Colombia's total fishery landings in 1957 amounted to 66.4 million pounds, valued at Ps 24,451,400 (US\$3.0 million), as compared with 46.7 million

pounding operations. The number of fishing companies with vessels has increased from 3 in 1956 to 5 in 1957 and 9 in 1958. In 1956, there were only 9 vessels of more than 10 metric tons as compared with 14 in 1957 and 36 in 1958. The number of canning firms has increased from 2 in 1956, to 4 in 1957, and 6 in 1958.

Colombia's Landings and Utilization of Fish and Shellfish, 1957

Principal Species	For Fresh Use		For Salting		For Freezing		For Canning	
	Quantity 1,000 Lbs.	Value US\$1,000	Quantity 1,000 Lbs.	Value US\$1,000	Quantity 1,000 Lbs.	Value US\$1,000	Quantity 1,000 Lbs.	Value US\$1,000
<b>Marine Fish:</b>								
Herring and related species	1,279.6	71.0	0.2	-	0.2	-	448.7	7.9
Tuna and tunalike	19.4	1.1	-	-	3.9	0.4	102.4	7.0
Mackerels	124.6	6.6	-	-	5.5	0.5	28.4	1.3
Snappers	2,625.9	155.6	21.0	1.3	817.2	57.9	216.6	8.2
Mullet	1,081.9	45.9	21.2	0.5	190.3	7.4	1,062.7	30.1
<b>Crustaceans:</b>								
Shrimp	23.6	5.1	25.0	5.3	134.9	34.1	329.6	95.2
Spiny Lobster	12.1	3.2	-	-	48.5	11.1	-	-
Fresh-water fish	27,239.4	1,140.8	29,684.4	1,257.2	55.0	3.4	303.7	6.9
Others <sup>1</sup>	305.7	17.4	17.3	0.1	82.9	5.7	51.7	4.6
<b>Total</b>	<b>32,712.2</b>	<b>1,446.7</b>	<b>29,769.1</b>	<b>1,264.4</b>	<b>1,338.4</b>	<b>120.5</b>	<b>2,543.8</b>	<b>161.2</b>

<sup>1</sup>Includes all other marine fish and crustaceans, mollusks, and sea turtles.

Note: Values converted at the rate of Ps. 8.17 equal US\$1.

pounds, valued at Ps 12,806,000 (US\$1.6 million), in 1956, recent statistics from the Ministry of Agriculture indicate. This was an increase of about 50 percent over the 1956 landings, states a recent dispatch from the United States Embassy at Bogota, dated July 10, 1958.

Fresh-water fish from the Magdalena River accounted for about 84 percent of the total 1957 landings, or 55.8 million pounds as compared with 37.7 million pounds from that same area during 1956. This increase was attributed to favorable climatic conditions. Thus far in 1958, the landings of fish from the Magdalena River have decreased as compared with the same period in 1957.

Since the demand for fishery products in Colombia is still greater than the supply, the average price of fish per pound increased from Ps 0.27 (3 U. S. cents) in 1956 to Ps 0.37 (5 U. S. cents) per pound in 1957, despite the increased catch. The prices of fish and shellfish are expected to continue rising.

Over-all fishing activity has also increased, due partly to the effects of Decree 0376 of December 13, 1957, which was designed to foster the development of the fishing industry. Almost all the firms connected with the fishing industry are augmenting their capital and ex-



## Cuba

### COD FISHING VESSEL PURCHASED:

The Cuban National Fisheries Institute has purchased from West Germany the M/V Arktis for the purpose of cod fishing on the fishing banks in the North Atlantic, according to a June 29, 1958, press report.

The vessel is 128.9 feet in length, and was built in Kiel, Germany, in 1950. It has a beam of 39.3 feet and a draft of 11.1 feet. Refrigerating facilities consist of 300 cubic meters capacity, and the vessel is expected to be able to transport 180 metric tons of fish. The Arktis is also equipped with radar, sonar, navigational equipment, and a fish-finding device.

The Cuban Economic and Social Development Bank, a Government financial agency, has granted the Institute a US\$225,000 credit to cover the purchase of the above vessel.

In 1957, 21.3 million pounds (valued at US\$4.4 million) of dried cod were imported by Cuba. Such imports came principally from Canada, Norway, Iceland, the United Kingdom, and France. The Institute expects to set up its own

## Cuba (Contd.):

cod industry to reduce imports of this traditional Cuban food staple. The Ark-tis will be manned by a Spanish crew, experienced in cod fishing, according to trade sources. The green cod will be brought refrigerated to Cuba for further processing ashore.

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**CONTRACT WITH CUBAN-JAPANESE TUNA FISHING COMPANY TO BE TERMINATED:**

The Cuban Instituto Nacional de la Pesca (National Fisheries Institute) has indicated that at a meeting of its Board of Directors on May 21, 1958, it was decided not to renew its contract with the joint Cuban-Japanese Fishing Company (Cia. Pesqueras Internacionales, S. A.) when it expires in September 1958.

The Vice President of the firm indicated that his company was not satisfied with the arrangement to furnish frozen tuna loins to the United States firms since it considers the real profits in the tuna fishing industry to be in the canning business itself and not in the supplying of raw material to the processors. He also pointed out that if, to comply with Cuban laws, the Japanese tuna clipper were to be purchased by a Cuban firm, the real problem would still be the use of a Cuban crew sufficiently capable of handling such a modern complicated fishing vessel. To do so would require the continued use of some Japanese fishermen who would have to be declared "technicians" in order to be excluded from the jurisdiction of current Cuban labor legislation restricting the employment of non-Cubans. In any case, the Institute had already shown some reluctance to continue with the contractual relationship with Pesqueras Internacionales, S. A. and the Japanese vessel Sumiyoshi Maru No. 12, and this has now culminated in the decision to terminate the contract with the company, effective as of September 1958.

The quantity of frozen cooked tuna loins prepared in Cuba from November 1957 to April 1958 was 375 tons (includes loins and flakes). These products were shipped to a Boston firm via New York City as frozen loins packed in 50-pound boxes (210 tons) for processing into tuna hams and sausages on a continuing basis. Also on a one-time basis only, 165 tons were shipped to a New York broker for canning in a Maryland plant for shipment outside the United States.

The joint Cuban-Japanese fishing company, defrosts and cooks the raw tuna and processes it into frozen loins for export.

As of the end of April 1958 the catch (principally off the Gold Coast near Africa) of the Japanese tuna vessel Sumiyoshi Maru No. 12 consisted of three trips of approximately 300 tons each. Out of a total catch of 907 tons, 800 tons consisted exclusively of tuna.

A small amount of tuna was permitted by the National Fisheries Institute to be consumed in Cuba during the period when local supplies were light. The joint Cuban-Japanese firm supplied such tuna to two local companies. One of the firms also has a contract, effective July 1, 1958, with the joint Cuban-Japanese firm to co-pack a canned product for export to all of Europe with the exception of Germany, under its own label.

As of April 1958 there were no other tuna products (frozen, canned, or prepared as "hams" or "sausages") produced in Cuba.

Raw tuna was purchased from the Japanese firm at prices based on United States west coast landed prices determined by cable sent to the west coast on the day the tuna is landed in Cuba. This price has varied from \$225 a ton to \$250 a ton. Sales prices on the frozen loins are based on a three-to-one formula, e.g., if the West Coast price is \$225 a ton, the price charged is \$675 per ton for frozen cooked tuna loins.

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**OPEN AND CLOSED SEASONS ON SOME MARINE SPECIES ANNOUNCED:**

The Cuban National Fisheries Institute imposed closed seasons, effective June 15, 1958, on the following marine varieties: oysters, turtles, tortoises, and shrimp. The pertinent resolutions invoking the above closed seasons appeared in the Official Gazette No. 109 of June 9, 1958 and will remain in force until cancelled by subsequent resolutions.

The closed season on oysters affects all of the aquatic regions of Cuba with the exception of the entire province of Oriente and the south coast of the province of Camaguey. Shipment of oysters captured in those regions must be accompanied by a transport permit issued by an Institute Port Delegate or the Naval Port Captain indicating the date, source, shipper, and the quantity of oysters covered by the permit.

Also effective June 15, 1958, the Institute resolved to terminate the closed season originally imposed April 1, 1958 on the capture of mojarra, states a June 13, 1958, dispatch from the United States Embassy in Habana.

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**SEASONS ON BULL FROGS, SNAPPERS, AND CRABS REVISED:**

The closed season on the capture of bull frogs, imposed on April 2, 1958, was terminated by the Cuban National Fisheries Institute effective July 5, 1958.



Bull Frog

The imposition of closed seasons, effective July 15, 1958, was announced for Moro or stone crabs, Cuban snapper ("cu-



## Cuba (Contd.):

bera"), cubereta, and gray snapper ("caballerote").

These revisions in seasons were published in the Official Gazette of July 4, 1958, states a July 11 dispatch from the United States Embassy in Havana.



## Denmark

## FAROES' PROPOSAL FOR 12-MILE FISHING LIMITS SUPPORTED:

The Danish Government announced on June 17, 1958, its support of a Faroe Islands Resolution that sets up a 12-mile fishing zone around the Islands for the exclusive use of Faroese fishermen. The Faroe Islands local Parliament early in June decided to join Iceland in extending territorial waters fishing limits for the Faroes to 12 nautical miles effective September 1, 1958. The formal resolution read: "Since Iceland has decided to remove her fishing limit to 12 miles from September 1, 1958, this fact has altered conditions for territorial waters so fundamentally that the Faroes must consider themselves free from the agreement with Britain dated June 24, 1901, as modified in the temporary agreement dated April 22, 1955, and the fishing limit around the Faroes will therefore have to be widened to 12 miles at the same date as Iceland." As the Faroes are under Danish jurisdiction, the resolution passes to Denmark for implementation internationally.

Following a discussion with the Faroes on the extension of fishing limits, the Danish Prime and Foreign Minister pointed out that the Government has assumed the standpoint during the recent Geneva Conference on the Law of the Sea that people like the Faroese, Icelanders, and Greenlanders, who by reason of their isolated geographical position are dependent to an unusual degree on the ocean, should be entitled to maintain a fishing zone of up to 12 miles from the basic lines constituting the point of departure for fixing territorial waters.

The Minister also pointed out that "the Danish Government fully understands the serious situation confronting the Faroe Islands and continues to adhere to the view that the present state of affairs with respect to the fixing of the limits of the fishing zone cannot continue to exist. In conformity therewith, the Government is in accord that the fishing zones of the islands ought to be 12 miles and it is fully prepared in conformity with the spirit and letter of the Home Rule Law to endeavor to have the Faroe Islands wishes, as expressed in the Resolution adopted by the Lagting (Island Legislature) on June 6, 1958, fulfilled. For the purpose of achieving this end Denmark will contact the British Government.

"The Danish Government had hoped that support might have been obtained from interested countries concerning the holding of a regional conference with a view to making an effort to bring about a joint solution of the fishing problem in the north Atlantic Ocean. According to investigations made, the Government does not expect that this idea can be realized."

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## POND TROUT INDUSTRY:

Pond-trout farming began in Denmark in 1904, and after several experiments it was found that the American rainbow trout variety was robust and well-suited for pond farming. It is known throughout Europe as a "Danish-born" trout.

The existence of pond-trout farming in Denmark is largely determined by the economics of location. In Jutland there is an abundance of clear fresh water in small streams which are easy to dam. The temperatures of the air and water are good for the trout year-around; and, most important of all, there is an abundance of inexpensive trout food.

There are about 400 trout farms in Denmark in which about 8.8 million pounds are produced annually at a value of US\$3.8 million. Almost all of the production is exported, principally to the United States, Italy, Sweden, and the United Kingdom.

Table 1 - Danish Exports of Pond Trout, 1957

Item	Country of Destination	Quantity	Value
		1,000 Lbs.	US\$1,000
Pond Trout:			
Live	-	1,275	699
Dressed	Italy	2,404	862
"	United States	2,243	1,186
"	Sweden	1,247	451
"	United Kingdom	1,214	436
"	Others	1,201	487
Total dressed		8,309	3,422

Note: Values converted at the rate of 6,907 kroner equals US\$1.

In the spring the female trout are scientifically stroked to induce spawning. The males are similarly milked. After being mixed with the sperm and some water, the eggs

## Denmark (Contd.):

are then placed in a special spawn hatchery, and set in gently running fresh water. Here they remain until the eye of each embryo can dimly be perceived through the pellicle.

The Danes have found that the eggs transport well at this stage and have developed a considerable export of trout eggs.

Table 2 - Danish Production of Pond Trout

Year	Quantity	Value
	1,000 Lbs.	US\$1,000
1957 1/	9,489	4,267
1956	8,680	3,604
1955	7,998	3,131

1/ Preliminary.

If the egg is to develop in pond culture, it remains in the hatchery until it casts off its yolk sack. Only then is it transported to other ponds as a young fish for further culture. This usually does not happen until fall. Trout do not reach edible size for another 1 1/2-2 years, and still another year is required if they are being produced for breeding purposes.

According to a trout research organization, 7 pounds of food are required to produce 1 pound of trout. This figure is disputed by the Ministry of Fisheries, which estimate that each fish consumes 11 to 17 pounds of food annually per pound of final weight. In Denmark the trout are fed exclusively on salt-water fish, mostly small herring with some sand eel (tobis) and whiting.

The problem of cannibalism is met, but not entirely successfully, by frequent sortings according to size.

Three years ago in Brønns, Jutland, a trout research organization, known as I/S Dansk Forsøgsdam-Kultur, was established, and at present is concerned with nutritional research, hormonology, and the treatment of fish diseases. The director of the research organization hopes to begin research soon on the hereditary biology of the species, aimed toward attaining uniformity in size. He claims that the breeders, owing to short-run economic considerations, have marketed the larger fish and used the smaller ones as breeders. He is convinced that the species could be improved, with eventual economic rewards, if the larger fish were kept for breeding.

The research organization is also concerned with the problem of stream pollution due to lignite mining, spillage from sewers and ensilage, and waste from chemical factories. The research station seeks out the source of the pollution on behalf of the breeder who is then able to obtain legal action against the pollution source because of Danish laws which were originally enacted in the interests of sports fishermen (U. S. Embassy in Copenhagen, dispatch dated April 9, 1958).



## German Federal Republic

## IMPORTS OF JAPANESE CANNED TUNA INCREASING:

Imports of Japanese canned tuna by West Germany have developed in a short period to the point where there has occurred an important change in the canned fish market, according to *Allgemeine Fischwirtschaftszeitung* of June 14. In fishery circles this increase has caused some worry.

In 1953 West Germany imported only 87.6 metric tons of Japanese canned tuna, while by 1955 it had reached 945.7 tons. In 1956 it increased to 1,609.7 tons and in 1957 to 2,810.3 tons. Because of the substantial increase in imports, the German fishery industry is questioning as to whether or not the Government is considering the curtailment of imports in the interest of retaining the domestic market for West German fishery products. (*Fiskets Gang*, July 3, 1958.)



## Hong Kong

## EXPORTS OF FISHERY PRODUCTS, 1957:

Exports of fishery products from Hong Kong during 1957, with one exception, were approximately the same as in 1956, according to a June 6, 1958, report from the United States Consulate in Hong Kong. The one significant change was in the export of fresh, frozen, or chilled crustacea and mollusks. Shipments of these products, mostly frozen shrimp, increased from 744 metric tons in 1956 to 1,328 tons in 1957. The greatest portion of this increase was represented by shipments to the United States which rose from 258 tons in 1956 to 696 tons in 1957, and at the end of the year there were indications they would continue to increase during 1958.

Shrimp exports to Canada also increased substantially during 1957. The Fisheries Officer of the Department of Agriculture believed the increased exports of frozen shrimp to the United States and Canada to be the most important development during 1957/58 for the local fishing industry.



## Iceland

## EXPORT FUND BILL PASSED:

The Icelandic Government's long-awaited Export Fund Bill was passed on May 29, 1958. The bill is the result of protracted research, internal debate, and compromises over the problem of how to meet the inflationary deficit in the state budget and the kindred problem of the growing gap between Icelandic costs and world fish prices, as reflected in the deficit in the Export Fund.

At first glance the new law might give the impression that the new scheme will make the existing complex multiple

## Iceland (Contd.):

exchange rate system even more complex. But for all its detail, the new law represents a considerable simplification, as regards imports, exports, and invisibles, compared to the 43 different effective rates of exchange in the system which it replaces.

Although the official rate of exchange will remain at 16.32 kronur to the U. S. dollar (buying rate 16.26), the effect of the Act can be summarized most easily as establishing, for the majority of currency transactions, an effective devaluation of 35 percent, or a selling rate of approximately 25.30 kronur to the dollar. For these transactions, importers and other purchasers of foreign exchange will pay a conversion fee of 55 percent, and—as an innovation, from the prewar system, purchases of kronur with foreign exchange will be credited with a 55-percent premium. This applies to tourists, foreign embassies, and even drawings on foreign loans, but not to the official kronur purchases of the Defense Force or the contractors thereto, and to certain other minor receipts.

A most important innovation in the new Act is to equalize the supported prices paid for groundfish, delivered to processors, whether from motor boats or trawlers, thus ending the discrimination from which trawlers suffer under the present system. Herring fisheries will still receive a lower level of export supports, but the margin below cod and other groundfish is narrowed. (United States Embassy dispatch from Reykjavik dated June 2, 1958.)

Following is a comparison of the percentage level of supports on f.o.b. export prices, under the old system and that proposed in the bill. The fisheries would, under the new plan, be required to pay a conversion fee of 55 percent on fuel, imported nets, and other supplies from abroad which at present they can purchase free of any special currency or import fees:

Iceland's Present and Future Support Levels for Fisheries

	Present Support Levels	New Support Levels
	.... (Percent) ....	
<b>All Fish Except Herring:</b>		
Motor boats .....	55.7	80.0
Trawlers .....	42.0	80.0
<b>Herring:</b>		
North Coast .....	19.3	55.0
Other Areas .....	40.6	70.0

The bill originally provided for a level of only 50 percent for the North Coast herring fisheries, but this was raised to 55 percent. The barrels for the coming summer season's herring have already been purchased, but next year, when the industry will have to pay the conversion fee on such imported supplies, the demand will be insistent that herring should be placed on the same support level as groundfish.

Payments under the new law are also equalized in the case of iced fish sold abroad, thus ending a form of discrimination objectionable to trawler owners. This is achieved by granting them the 55-percent exchange premium on the foreign currency which they turn into the banks from their sales, plus an additional 25 percent on the f.o.b. value of the catch to equal the 80-percent compensation for all groundfish exports.

Since the export industries will have to pay an estimated Ikr 202 million (US\$12.4 million) annually in fees on their fuel oil, nets, etc., the increased supports are extended to leave the motor boat operators in much their present position, but will give some additional relief to trawlers.

To add to its complexity, Icelandic foreign commerce is characterized not merely by supports to the export fisheries, but by taxes on these exports as well, which one Althing member described as taking money from one pocket and putting it into another. The existing law provides for a 2.25-percent export fee on fisheries products, whose proceeds are divided as follows: 74 percent to Fisheries Loan Fund (to purchase new vessels); 4 percent to fisheries research (on new processing methods); 4 percent to Union of Icelandic Fishing Vessel Owners; and 18 percent to Fisheries Experimental Fund (on new catch methods).

The new law, as amended by the Althing, adds a surcharge to this fee of 65 percent of which 11/13 will go to the Fisheries Fund, 1/13 to the Experimental Fund, and 1/13 to the Fisheries Department of the University Research Institute.

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FISHING LIMITS EXTENDED  
TO 12 MILES BY DECREE:

An advance text of a decree extending Icelandic territorial waters fishery limits from 4 miles to 12 miles was published in the Icelandic newspaper *Thjóðviljinn* in May 1958. Iceland on June 30, 1958, officially published regulations concerning fishery limits as follows:

"Article 1. The fisheries' limits off Iceland shall be drawn 12 nautical miles outside base lines drawn between the following points: (baselines as defined in March 19, 1952, regulations):

"Article 2. Within the fisheries' limits all fishing activities by foreign vessels shall be prohibited in accordance with the provisions of Act No. 33 of June 19, 1922, concerning fishing in territorial waters.

"Article 3. Icelandic vessels using bottom trawl, floating trawl, or Danish seine netting shall be allowed to fish within the fisheries' limits but outside the limits determined by Regulations No. 21 of March 19, 1952.

"Before these regulations become effective special provisions about such licences shall be promulgated stating further about fishing zones and periods.

"Article 4. Trawling vessels shall have all their fishing gear properly stowed aboard while staying at places where fishing is prohibited.

"Article 5. Fisheries' statistics shall be forwarded to the Fiskifelag Islands (Fisheries Association of Iceland) in the manner prescribed by Act No. 55 of June 27, 1941, concerning catch and fisheries' reports.

"If the Ministry of Fisheries envisages the possibility of overfishing the Ministry may limit the number of fishing vessels and the maximum catch of each vessel.

"Article 6. Violations of the provisions of these regulations shall be subject to the penalties provided for by Act No. 5 of May 18, 1920, concerning prohibition against trawling; Act No. 45 of June 13, 1937, concerning Danish seine netting in territorial waters, Act No. 33 of June 19, 1922, concerning fishing in territorial waters, as amended, or, if the provisions of said Acts do not apply to fines from Kr. 1000.00 to 100,000.00 <sup>1</sup>/.

"Article 7. These regulations are promulgated in accordance with Act No. 44 of April 5, 1948, concerning the scientific conservation of the continental shelf fisheries, as amended by Act No. 81 of December 8, 1952. As soon as it becomes operative Regulations No. 21 of March 19, 1952, concerning conservation of fisheries off the Icelandic coasts shall cease to be effective.

"Article 8. These regulations become effective on September 1, 1958.

"Ministry of Fisheries, Reykjavik, June 30, 1958."

According to a Reuters news item of July 1 from Iceland, that country's Fisheries Minister said the Icelandic continental shelf really is a part of his country and is clearly demarcated from the shelf of other countries. Also, that it is only sensible that Icelanders, not foreigners, should work the fishing grounds around their own country. <sup>1</sup>/About US\$61-66,130.



## India

### OFFSHORE EXPERIMENTAL FISHING PLAN INITIATED:

The Government of India has decided to pool together the new types of large mechanized vessels (a total of 21) for experimental fishing in deep-sea waters. The fishing vessels will be grouped into four fleets, one each to be established at Bombay, Cochin, Tuticorin, and Visakhapatnam, for systematic exploration of the seas for offshore fishery resources in their respective regions.

The organization of experimental fishing on a regional basis will, however, be flexible enough to allow fishing vessels to be moved from one area to another, particularly when these cannot be operated because of monsoon or bad climatic conditions. This will not only ensure fuller use of fishing vessels but also encourage commercial fishing by State, cooperative, or private agencies, according to the May 1958 Trade News, published by Canada's Department of Fisheries.



## Israel

### RECENT DEVELOPMENTS IN THE FISHERIES:

The official inauguration of a new fishing base at the basin off the coast of Ashdod, Israel, took place on June 26, 1958, states a July 2 dispatch from the United States Embassy at Tel Aviv. The selection of this new fishing base was made after investigations proved that it was the richest fishing area on Israel's southern Mediterranean coast which, in the March-June 1958 period alone, yielded a catch of 600 metric tons of sardines, nearly as much as the record catch of 636 tons for the entire year of 1957.

The basin, the only one south of Tel Aviv and originally built by the Palestine Electric Corporation for its power plant there was turned over to the Ministry of Agriculture by that company for the exclusive use as a fishing base. The base began operations with five workers last December, and at present, the Ashdod fishing base has 20 fishermen who oper-

ate 2 motor vessels and 4 small boats. Apart from two Italian instructors, all the fishermen are new immigrants, mostly from North Africa, who reside in Ashdod and work on a percentage basis, receiving from 4 to 6 percent of the catch.

According to the Minister of Agriculture at the dedication ceremony, the establishment of this fishing base is regarded as another modest step toward the conversion of Ashdod into a major port city, which is in line with the plans of the Government of Israel to erect a deep-sea port in Ashdod. In the meantime, the Fisheries Department of the Ministry is studying plans for the establishment of a fish cannery in the area, or a branch plant of an already existing enterprise, although the Fisheries Department is currently dealing mainly with transport and marketing problems of fresh fish. Fishing in Israel hereto had been concentrated largely between Tel Aviv-Haifa, whereas it is now intended to explore this new rich fishing area in the southern sector of the country's Mediterranean coast. The local fishing industry currently provides only about half of the fish consumed in Israel.

Fishing in Israel			
Unit		1957	1953
<b>Sardine Fishing:</b>			
Fishermen groups . . .	No.	20	14
Fishermen . . . . .	No.	200	168
Yield of fish . . . . .	Metric tons	636	252
<b>Fish Canning Industry:</b>			
Enterprises . . . . .	No.	8	6
Fish processing . . . .	Metric tons	1,000	300
Output . . . . .	Million cans	5	1.5
Work days . . . . .	No.	41,000	12,000
<b>Fishing in Ashdod:</b>			
		June 1958	January 1958
Fishermen . . . . .	No.	20	5
Fishing vessels . . . .	No.	9	2
Yield of fish . . . . .	Metric tons	3.0	0.3

Another development in Israel's fisheries over the past several months is a seven-year expansion plan drawn up by the Fish Breeders' Union for the large-scale breeding of nutria (coypu), a South American rodent, in their fish ponds together with the carp, as done in Argentina. The Breeders' Union is confident that it will eventually be in a position to export hundreds of thousands of dollars worth of furs and the latest reports show that the animal lives well in ponds without affecting the carp.

Experiments have also been carried out by local fish breeders with the sabra



## Israel (Contd.):

buffalofish in Israel ponds, following the importation two years ago of 35 young buffalofish from Alabama in the hope that they would produce a brood to coexist with local carp in the country's fish ponds. However, fish breeders have now given up hopes for the natural birth this season of a generation of this type of fish and they now intend to give the females hypopsis injections to speed the laying process. Last year the fish laid no eggs, although they thrived in Israel ponds to a good size, without producing, however. An earlier attempt to import buffalofish in the form of eggs failed with the death of all the fish that were hatched. Even if the planned injections should fail to bring results, the breeders will wait another year, since there is a possibility that the fish may need longer to mature in Israel waters. Officials at the Dor Research Station of the Israel Department of Fisheries are keeping the fish in the best possible prespawning condition, and experts are of the opinion that there will be no integration problems as experiments have shown that the buffalofish and the Israel carp together thrive well in Israel.



## Mexico

#### COOPERATION OF U. S. SHRIMP VESSELS FISHING OFF COAST REQUESTED:

The U. S. Department of State received a communication from the Mexican Government in May 1958 requesting cooperation by United States shrimp vessels fishing in waters off Mexico.

The communication requested that United States shrimp vessels carry their nets inboard when present in Mexico's territorial waters and that prior authorization be obtained from the Mexican Ministry of Marine to anchor in such waters. It was also requested that when an American vessel is forced to put into a Mexican port, the captain, unless prevented by justified physical impossibility, report personally to the authorities informing them of the reasons for entry with an estimate of the time the vessel will remain in Mexican waters.

The communication also called attention to a requirement that before leaving a Mexican port, United States fishing vessels must obtain clearance (which includes approval of the vessel's manifest, the bill of health, and the crew list) from the appropriate Mexican Consular Official.

Mexican national officials have requested that American shrimp vessels be asked to fly the United States flag and to permit identification visits by Mexican naval vessels when in Mexican territorial waters and for the purpose of safety of navigation to refrain from turning off lights and running when a Mexican naval vessel appears.

Laws of the United States require the maintenance of appropriate lighting aboard American vessels and the failure to do so creates a problem of safety at sea. The United States, however, does not require United States vessels to fly the United States flag. This information is passed on to the American shrimp fleet so that it may know of the Mexican request in this connection for purposes of identification.

The U. S. Department of State is informing the Mexican Government that it is communicating the request of the Mexican Government to the United States shrimp industry, on the understanding, however, that it has reference only to the shrimp fleet's activities within three marine miles of territorial sea recognized by the United States.

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#### VERACRUZ FISHERIES TRENDS, APRIL-JUNE 1958:

Landings of 11.0 million pounds of fish, made off the coast of Veracruz by Mexican fishermen in 1957, will be equalled or surpassed during the current year, indicates a United States Consulate dispatch (July 7, 1958) from Veracruz.

During April-June 1958 there were excellent catches of mackerel, robalo, and other fish. With the possible exception of the robalo, in each instance, the catches were of such size that the market was temporarily flooded, causing a drop in prices. In at least one instance, the fishermen discontinued their opera-

## Mexico (Contd.):

tions after a few days of successful fishing, because the market price was so low. There was no incentive for them to continue their work, even though fish were available in nearby waters in large quantities.

As usual, the problem of adequate refrigeration facilities to handle large catches of fish continues to plague the Veracruz fishermen. There appears to be no indication of plans to build new refrigeration facilities in the coastal area to service the needs of the fishermen.

Recently, a tuna resource was discovered off the coast between Veracruz and Alvarado, but press reports indicate that the resource is not too large, and that in any event Mexico does not possess the boats, equipment, and fishermen adequate for this particular type of fishing.



## Netherlands

ANTARCTIC WHALING  
TO BE CONTINUED:

Holland will not discontinue whaling expeditions with the factoryship William Barendsz II, according to the Director of Fisheries of the Netherlands Ministry of Agriculture, Fisheries, and Food. Commenting on recent suggestions by the Audit Office to stop whaling expeditions because of the losses involved, the Director said that it would be wrong to do so since Holland would "cast away the possibility of supporting itself in the field of whale oil if future conditions should take a turn for the worse." The Director said that it would be difficult to resume whaling operations once the expeditions were discontinued. He said that he was optimistic about Dutch whaling operations in 1958. (June 18 United States Embassy dispatch from Amsterdam.)

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FISHING ASSOCIATIONS PROTEST  
ICELAND'S FISHING  
LIMITS EXTENSION:

Private fishing associations from seven European countries at a meeting on

July 15, 1958 at Scheveningen discussed the decision of the Icelandic Government to extend its fishing limits from 3 to 12 miles. The press reported that a joint resolution was prepared asking the governments of the respective associations to urge Iceland to reconsider its decision. It was decided to hold a further meeting before September 1 to consider further measures provided no satisfactory solution was found.

Although Dutch trawlers do not ordinarily operate off Iceland, they fear that the waters in which they normally fish may become overcrowded if the trawlers of other nations are displaced from Icelandic fishing grounds, states a July 18, 1958, dispatch from the United States Embassy at the Hague.

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## HERRING CATCH LOWER IN 1957:

Landings of 166.7 million pounds of herring in the Netherlands in 1957 were the lowest since 1945, according to the 1956/57 report of the Netherlands League of Herring Dealers. Prices increased with the drop in landings, but the herring trade has reaped relatively little from the upward trend in business during the past few years. There is growing concern about the failure to provide protective measures for Dutch herring in the European market. Biologists are not agreed on the causes of the continual decline in herring catches.

Contracts concluded with the Russians in 1957 called for the export of 100,000 casks of herring. No exports of herring to Russia were made in 1956, states a June 13, 1958, dispatch from the United States Consul at Rotterdam.



## New Hebrides

## TUNA FISHING INDUSTRY TRENDS:

Reports from the tuna plant at Palikulo (southwest coast of Espiritu Santo), New Hebrides, indicate a high percentage of albacore in the catches of the Japanese boats supplying the plant.

Built in 1957, the plant is now in full operation. The plant can handle 32 tons

### New Hebrides (Contd.):

of fish a day, has smoke-curing and brine facilities, has a storage capacity of 500 tons of fish at present (with an additional 200-ton capacity planned), and also can manufacture 20 tons of ice (in 200-pound blocks) a day for the use of the fishing vessels.

Only frozen and cured fish are being exported so far, but a cannery may come later.

At the time that the company that operates the plant was being formed, it was stated that a catch of 3,000 tons a year would be necessary to make the venture worthwhile. Heaviest catches were anticipated during the cooler months. The company, a local one, set up the plant with United States and Japanese backing and Japanese fishing know-how.

Eight to twelve Japanese boats are working under contract for the New Hebrides plant.



### Norway

#### COD FISHERIES TRENDS THROUGH JUNE 7, 1958:

From January 1 to June 7, 1958, North Norway's total landings of young cod and spawning cod amounted to 127,987 metric tons as compared with 106,244 tons last year. Of this year's landings, 78,335 tons were sold for drying, 30,344 tons for curing, and 19,308 tons for fresh purposes. (Fiskets Gang, June 12, 1958.)

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#### FISHERIES TRENDS, JANUARY-APRIL 1958:

**Herring Fisheries:** The winter herring shoals arrived unusually late off Norway this season. Apparently they were not as dense as formerly. The weather was cold and stormy through most of February and in the beginning of March. All this gave birth to the fear that the present herring period, which has lasted nearly 70 years, is drawing near its expiration. The landings through April 1958 (when the bulk of the herring landings were made) amounted to less than half of last

year's and less than a third of those in 1956. For the fleet of some 2,600 purse seiners and drifters and their crew of 26,000 fishermen, the season was highly unremunerative. Their gross income was 80.3 million kroner (US\$11.2 million) against 183.0 million kroner (\$25.6 million) in 1957 and 248.7 million kroner (\$34.8 million) in 1956. On the other hand, the equipment and operational costs are estimated at 125 million kroner (\$16.1 million) in 1958.

Table 1 - Norwegian Herring Landings and Disposition, January-April 1956-58

	1958	1957	1956
	..... (Metric Tons) ....		
Landings .....	341,868	795,615	1,145,853
Disposition:			
Iced or frozen. ....	65,007	106,299	101,649
Curing .....	80,166	81,003	107,508
Canning .....	7,533	14,601	11,997
Reduction. ....	178,374	584,970	913,074
Bait .....	6,882	4,278	6,417
Inland consumption .	3,906	4,464	5,208

The foreign buyers of iced winter herring got 29,700 tons, which is 26,000 tons less than last year. None of them got what they planned.

The production of frozen winter herring amounted to some 620,000 standard cases (about 31,620 tons) against 870,000 cases last year. The industry was forced to negotiate for reduction of their advanced sales. The marketing prospects this year were good.

The production of cured herring amounted to about 590,000 barrels. After a change of the original sales agreement with the Soviet Union, the shipment obligation for that market and for Poland, Eastern Germany, and Czechoslovakia amounted to 475,600 barrels. The balance was subject to special treatment and was earmarked for customers in free markets.

The severe cold this winter had a limiting effect on the operation possibilities for fat and small herring. Thus most of the catch of fat and small herring was landed through April when the conditions had improved. Last year's corresponding catch was twice as big.

**Capelin:** The capelin fishery, which takes place in Finnmark waters, has been very successful. From mid-March to April 1958 more than 90,000 metric tons were landed and practically all for reduction. Last year's final figure was 72,200 tons.

**Meal:** The production of herring meal and meal of capelin amounted to 60,000 tons. Advanced contracts for shipments abroad of 40,000 tons of meal had been negotiated. In addition, 40,000 tons have to be reserved for Norwegian requirements. In other words, a considerable credit has been drawn on future production, and Norway has at present no herring meal available for further sales.

In order to improve this situation of scarcity, an extensive fishing campaign in Icelandic waters was planned for the summer.

## Norway (Contd.):

**Cod Fisheries:** North Norway's (Finnmark and Lofoten) landings of spawning cod January-April 1958 were higher than last year's. Nevertheless, they were considerably below average. The Lofoten fishery yielded 33,006 metric tons as against 22,938 tons in 1957 and 63,492 tons in 1956. The 1956 Lofoten catch is considered a normal one.

In the Finnmark young cod fishery, the period from the end of March to mid-June plays an important part in the seasonal Norwegian cod fisheries. Certain conditions of sea temperature, wind, and currents tend to lead the migrating shoals of young cod to the waters off Finnmark at this time of the year, and may, if the weather permits, form the basis of good fishing. This season has obviously complied with the conditions. The fishing has been very rich.

Table 2 - North Norway's (Finnmark and Lofoten) Spawning and Young Cod Landings and Disposition, January-April 1956-58

	1958	1957	1956
	... (Metric Tons) ...		
Spawning cod . . . . .	67,642	57,975	106,041
Finnmark young cod . . . . .	30,112	16,413	10,814
Total . . . . .	97,754	74,388	116,855
<b>Disposition:</b>			
Dried (unsalted) . . . . .	53,147	32,657	42,536
Cured . . . . .	28,603	32,031	56,651
Iceing or freezing . . . . .	16,004	9,700	17,668
<b>Byproducts produced:</b>			
Cod-liver oil . . . . .	4,396	3,063	5,361
Roes for curing . . . . .	2,394	2,541	3,273
Roes for fresh purposes . . . . .	1,376	1,074	1,351

As indicated in table 2, obviously the producers have had much confidence in the stockfish (dried fish) marketing prospects. This situation seems, however, at least to have entered a temporary change. The stockfish exports developed very satisfactorily last year and through January and February of this year. Since March, however, the important African market has been a very reserved buyer. Competition from Iceland, and perhaps also too optimistic price demands, created this situation. As to the Italian market, the trade at present can only offer insignificant quantities of the qualities and sizes preferred. The prospects of the Italian trade are expected to improve in July and onwards, when this year's production is dry and ready for shipment. Italy prefers the big size Lofoten fish, which this year ought to command a high export price. In any case the production is not too big, and producers have paid a high price for the raw fish.

The smaller production of salted cod is a result of poor marketing prospects for klipfish (dried salted cod). The deflationary development in Brazil has stopped exports. As Brazil is the chief Norwegian klipfish market, every effort is being made in order to normalize the situation. On the Portuguese market low-priced offers from France, Iceland, and partly Newfoundland has reduced the sales prospects for Norwegian klipfish. Altogether the bright spots of the klipfish trade are few.

Iced fish and frozen cod has moved rather well this year.

Cod-liver oil and other fish oils are moving slowly in dull markets. (*Norwegian Fishing News*, vol. 5, no. 1.)

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# EXPORTS OF FISHERY PRODUCTS, 1957:

Norwegian exports of fishery products and byproducts during 1957 amounted to 724,684 metric tons, valued at US\$186.6 million, according to *Norwegian Fishing News* (no. 1, vol. 5, 1958).

Norwegian Exports of Fishery Products and Byproducts, 1957		
Product	1957	
	Quantity	Value
	Metric Tons	US\$
Fresh herring . . . . .	57,138	3,839
Frozen herring . . . . .	45,686	4,009
Fresh fish . . . . .	26,375	6,417
Fresh fillets . . . . .	316	100
Frozen fish, round . . . . .	7,872	4,152
Frozen fillets . . . . .	17,318	6,237
Stockfish (dried unsalted fish) . . . . .	36,040	21,772
Fish, salted and dried (Klipfish) . . . . .	42,193	20,058
Salted herring . . . . .	62,883	8,381
Salted fish . . . . .	9,942	2,324
Salted smoked herring . . . . .	4,004	833
Shellfish . . . . .	2,897	4,034
Canned fish (all kinds) . . . . .	42,881	24,284
Salted cod roe . . . . .	1,387	239
Herring meal . . . . .	120,468	20,005
Groundfish meal . . . . .	14,231	1,921
Seaweed meal . . . . .	7,342	415
Fish-liver meal . . . . .	920	139
Whale-meal meal . . . . .	10,106	1,285
Fish oils and fish-liver oils . . . . .	141,697	34,166
Refined hardened oils and fats made of aquatic animal oils, edible and inedible . . . . .	72,988	21,941
Total . . . . .	724,684	186,551

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# FISHING LIMITS PROBLEM CONSIDERED BY STORTING:

In answer to a question on fishing limits raised in the Norwegian Storting on June 18, 1958, the Foreign Minister stated that if the problem continues, Norway will be forced to extend its fishery limits. He stated further that: (1) Norway was not in agreement with the decision made by Iceland to extend its fishing limits to 12 miles; (2) the problem is much broader than whether or not Iceland and the Faroe Islands will consider Norwegian fishing interests and also hinges on whether these States are willing to consider interests connected with maintenance and strengthening of the "Law of the Seas;" (3) the best method of changing fisheries boundaries is by international agreement; (4) for Iceland and the Faroe Islands the 12-mile fishing limits merely mean a delay until an in-



## Norway (Contd.):

ternational conference is held; (5) the Norwegian Government strongly desires, through informal, friendly discussions with Iceland to find a way out of present situation and would like to see such discussions take place with all countries directly concerned with fishing in northern waters; (6) Norwegians understand the Danish position in proposing a regional conference and will participate to protect Norwegian interests if a conference is held, but doubt that open formal negotiations will lead to agreement; and (7) if negotiations fail, a situation might arise in the fall of 1958 forcing Norway to take measures to "protect fishing banks along our own coast against results of trawlers from many countries being denied access to traditional fishing areas in the western part of the Norwegian Sea." (U. S. Embassy, Oslo, dispatch of June 19, 1958.)

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SHRIMP FISHERY:

About 1954 a large increase took place in the shrimp fishery in Rogaland, Norway. Before that, shrimp were landed with an annual value of about 3 million kroner (US\$420,000). Since the fishery began on the Skudesnes grounds, shrimp have been landed with an annual value of 8-9 million kroner (US\$1.1-1.3 million), and this prominent fishery continues. The shrimp fishermen, however, have taken to sea, and quite a number of them have made good catches. Frequently shrimp fishermen have landed catches of 1,300-1,800 pounds in two-day trips, and those really fortunate have landed more than 2,200 pounds. As prices rise in the course of the winter to 5-6 kroner per kilogram (32-39 U. S. cents a pound) heads on, even small catches may give reasonable incomes to the fishermen.

Before the Skudesnes grounds were discovered, most of the shrimp catches were landed in Egersund. Since that time a number of shrimp landing stations have been erected. On the Karmøy there now exist three such shrimp landing stations, two in Skudsneshavn, and one in Aakrehavn, with 150 workers employed during the better part of the season.

The number of vessels participating in the shrimp fishery has also increased--200 shrimp trawlers are operating on the shrimp grounds in spring and summer, and a good half of the fleet belongs to Karmøy. In the southernmost part of the Rogaland County there also exists a number of landing stations for shrimp, first of all in Egersund, where several landing stations and shrimp plants are situated but also in Store Sirevaag where a considerable quantity of shrimp is landed every year.

One year ago a prominent exporting firm established its own landing station and freezing plant in Stavanger, where all kinds of fish are received for distribution to the different markets inland and abroad. Production of fish fillets is an important part of the activities of this prominent sales organization. This firm had a record-breaking year in 1957, with a total sales turnover of 17 million kroner (US\$2.4 million), apportioned between shrimp, fish, and lobster.

Very great quantities of shrimp are found off the North Sea grounds, sometimes far at sea, and at other times quite near the shore. When the shrimp fishery started on the Skudesnes grounds, the shrimp were caught just one hour's journey west of Geitungen; later on, however, the shrimp trawlers went to the Reef. Thus, the favorable places for the fishery changes. The shrimp fishery depends to a rather large extent on fair weather conditions. A number of Egersund trawlers are carrying on the shrimp fishery all year round, and those most successful may have shares of about 11,000 kroner (US\$1,540).

Shrimp trawling also yield a considerable quantity of mixed fish catches, which supply one half of the feed necessary for the important Norwegian mink-breeding industry, which operates with export figures of some 60 million kroner (US\$8.4 million) a year.

The failure of this winter's herring fishery will certainly lead to an increased activity in the Norwegian shrimp fishery. (Norwegian Fishing News, no. 1, vol. V, 1958.)

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## Norway (Contd.):

**WHALING FIRMS TERMINATE AGREEMENTS WITH OFFICERS AND CREWS:**

Press reports from Norway state that all Norwegian whaling companies have sent termination notices to their officers and crews, totaling some 5,000 men. The reasons given by the companies for this action are that the whale-oil market has become increasingly weaker in recent years, that more than half of last year's production is still unsold, and that the prospects for further sales in the near future are not bright. Referring to the enormous costs of sending whaling expeditions to the Antarctic, each company stated in its notices that its participation in the 1958/59 season is uncertain. One whaling company stated to the press that the action was a means of giving the companies a free hand in a situation of uncertainty. The company declared, however, that there will still be some Norwegian whaling.

The whaling companies are in a difficult situation. With large stocks of unsold whale oil and a declining market, they are increasingly reluctant to invest the large sums required each year to outfit expeditions to the Antarctic (United States Embassy in Oslo, dispatch dated June 6, 1958).

**Pakistan****FISHING VESSELS TO BE EQUIPPED WITH DIESEL ENGINES:**

The program for mechanization of Pakistan's commercial fishing fleets was accelerated following the arrival (about April 1958) of 70 Danish marine Diesel engines purchased under the U. S. International Cooperation Administration's (ICA) commodity aid program for Pakistan.

Fifty of the engines were delivered to Karachi for installation in West Pakistan fishing vessels and 20 have arrived in Chittagong for use by East Pakistan fishermen, according to the Pakistan publication Dawn.

The 70 marine engines, of 10, 20, and 30 horsepower, will be allocated to individual fishermen by a committee set up by the Central Fisheries Department. Ten additional similar small engines were due to arrive in Karachi and 81 more engines with larger horsepower ratings were due to arrive in July or August 1958.

The engines and spare parts imported under the ICA program at a cost of US\$500,000, will provide several important benefits to Pakistan. They will permit fishing vessels to go farther to sea, where they can explore new fishing grounds and the boats will be able to return to port faster with fresher catches.

Also, it is expected that boats equipped with the Diesel marine engines will be able to double their catch of edible fish, bringing more cash income to the fishermen and providing more high protein food for the consumers (Trade News, Canada's Department of Fisheries, May 1958).

**Philippines****CANNED FISH RETAIL AND WHOLESALE PRICES, JULY 1, 1958:**

Retail and wholesale prices on July 1, 1958, for canned sardines in Manila were:

Product	Wholesale US\$/cs.	Retail US\$/can
Canned Sardines:	(48 15-oz. cans)	(15-oz.)
U. S. brand . . . . .	15.25	32.5-35
Japan brand . . . . .	10.90	22.5-27.5
Canned Salmon:	(48 16-oz. cans)	(16-oz.)
U. S. brand . . . . .	30.25	70-75
Japan brand . . . . .	31.50	70-75

**Portugal****CANNED FISH EXPORTS, JANUARY-APRIL 1958:**

Portugal's exports of canned fish during January-April 1958 amounted to 17,875 metric tons (1,127,000 cases), valued at

## Portugal (Contd.):

US\$10.0 million, as compared with 13,253 tons, valued at US\$8.5 million, for the same period in 1957. Sardines in olive oil exported during the first four months of 1958 amounted to 12,496 tons, valued at US\$6.9 million.

Portuguese Canned Fish Exports, January-April 1958			
Species	Jan.-April 1958		US\$
	Metric Tons	1,000	
Sardines in olive oil . . . . .	12,496	6,928	
Sardineline fish in olive oil . . . . .	2,233	1,559	
Sardine & sardineline fish in brine . . . . .	357	91	
Tuna & tunalike fish in olive oil . . . . .	482	387	
Tuna & tunalike fish in brine . . . . .	177	86	
Mackerel in olive oil . . . . .	1,777	826	
Other fish . . . . .	353	121	
Total . . . . .	17,875	9,998	

During January-April 1958 the leading canned fish buyer was Germany with 2,784 tons (valued at US\$1,598,000), followed by Italy with 2,312 tons (valued at US\$1,240,000), Great Britain with 2,141 tons (valued at US\$1,141,000), the United States with 1,894 tons (valued at US\$1,375,000), and Belgium-Luxembourg with 1,324 tons (valued at US\$708,500). Exports to the United States included 663 tons of sardines and 977 tons of anchovies. (Conservas de Peixe, June 1958.)

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### CANNED FISH PACK, JANUARY-FEBRUARY 1958:

The total pack of canned fish for January-February 1958 amounted to 3,037 metric tons as compared with 3,129 tons for the same period in 1957. Canned sardines in oil (1,986 tons) accounted for 65.4 percent of the January-February 1958 total pack, higher by 11.4 per-

Portuguese Canned Fish Pack, January-February 1958		
Product	Net	Canners
	Weight	Value
	Metric	US\$
	Tons	1,000
In Olive Oil:		
Sardines . . . . .	1,986	1,152
Sardinelike fish . . . . .	201	92
Anchovy fillets . . . . .	653	581
Tuna . . . . .	66	60
Other species (incl. shellfish) . . . . .	33	21
In Brine:		
Sardinelike fish . . . . .	42	5
Other species . . . . .	56	10
Total . . . . .	3,037	1,921
Note: Values converted at rate of 28.75 escudos equals US\$1.		

cent than the pack of 1,782 tons for the same period of 1957, the June Conservas de Peixe reports.

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### DEVELOPMENT PLAN FOR FISHERIES PROPOSED:

The proposed Second Six-Year Development Plan for Portugal provides for the investment of 550 million escudos (approximately US\$19,250,000) in the fishing industry during the period 1959-1964.

The bulk of the estimated investment will be devoted to modernizing and enlarging the various fishing fleets. While possible overproduction in certain sectors and overfishing in certain areas placed limitations on development of some fleets, maintenance of employment of fishermen called for consideration in others.

Construction and improvement plans contemplate increased production both for domestic consumption and for export with major emphasis on cod for domestic consumption and tuna for export.

The proposed development plans for the tuna and sardine sectors follow:

**Sardine Industry:** The proposal estimates that 20 million escudos (US\$700,000) will be invested in the construction of 20 sardine vessels during the 1959-1964 period. All of the new vessels will be replacements for old ships and no increase in fleet capacity is anticipated. In fact, the proposal points out that the present number and tonnage of the ships in the sardine fleet exceeds present requirements.

In order that productivity and income of the sardine fleet may be increased, certain improvements are to be made. The 25 percent of the fleet not yet so equipped will be fitted with echo-sounding devices. The 40 percent of the fleet presently without radiotelephone will be equipped with TSF devices. Because of their light weight, durability, low maintenance cost, and greater capturing power, the production and use of synthetic fiber nets is recommended by the proposal. In addition, the fleet is to be equipped with mechanical devices for hauling in nets. This equipment is to be of the type used by the California sardine fleet.

It is expected, the proposal states, that the number of shipowners will decrease by reason of the merger of companies into more economical units.

Expansion of the sardine canning industry is not dependent upon the acquisition of greater quantities of fish by the fleet since the canners absorb something less than half of the annual catch. The problem for the canning industry, the proposal points out, is to obtain sardines at more favorable prices and without being subjected to the uncertainties of the auction system. Decree Law No. 40,787, which was published on September 7, 1956, but which has not yet been put into effect, attempts a solution to the problem. The first paragraph of that Decree-law provides that the sardine shipowners guild will enter into a contract with the sardine canning and industrial guilds for the purchase and sale of fish at an agreed price. In the event the guilds can not agree, the Minister of the Navy and the Minister of Economy are authorized to establish the conditions of sale. The proposal is silent as to why this Decree-law has not yet been put into effect.

Since purchasers of sardines for fresh consumption are direct competitors with canners for supplies, the proposal takes a look at the probable demand for sardines for fresh consumption. Population growth and increased per capita income naturally point to an increase in demand by fresh sardine consumers. This increased demand may be tempered to some degree, the proposal notes, by a shift in consumer tastes resulting from a higher standard of living. The proposal ventures no forecast in this regard, however, and appears to conclude that the demand for sardines for fresh consumption will increase during the 1959-1964 period.

## Portugal (Contd.):

**Tuna Industry:** The proposed Second Development Plan points out that Portugal presently produces about one percent of the total world production of tuna. This percentage is expected to be doubled by reason of an investment of 92 million escudos (US\$3,220,000) in the tuna industry during 1959-1964.

Investments include the acquisition of 6 large vessels of the tuna-clipper type, 17 vessels for local and coastal fishing, and the construction of freezing facilities. The 6 large clipper-type vessels are to be capable of extending their fishing operations as far as Angola while based in Portugal or the Azores.

Freezing facilities, of unspecified size, are to be built in the Azores and northern Portugal. These facilities would be utilized for freezing tuna landed by the coastal vessels during four months of the year. In addition, the freezing facilities in the Azores would be used during the remaining months as storage warehouses for meat produced in the islands pending shipment to markets where meat may be in short supply.

The proposal observes that the important development in the tuna industry is to change from traditional coastal fishing to long-distance, high-seas fishing in order that the industry may profit from Portugal's "privileged position" and the favorable conditions under which it can compete in foreign markets. The freezing of tuna, the proposal continues, has increased the advantage of fishing nations in supplying raw materials to canning nations. No difficulty is foreseen in selling frozen tuna abroad because the United States market is considered to be far from saturated and recently European markets, especially Italy and France, have been paying better prices for fish received directly from fishing vessels.

The discussion of the development of the tuna industry during the period of the Second Development Plan tends to reflect the intention for Portugal to concentrate on becoming a supplier of raw materials (frozen tuna) rather than a supplier of the finished product. The proposal points out that the majority of nations which do not produce sufficient tuna for their canning industry do not tax imports of frozen tuna. On the other hand, however, imports of canned tuna are subject to import duties which are sometimes very high. The proposal concludes with the observation that the economical exploitation of the frozen tuna trade would free Portugal from the vagaries and uncertainties inherent in the exploitation of other products for which the more industrialized nations do not have such a "prime need."

**Cod-Fishing Industry:** The government proposes an investment of 210 million escudos (US\$7,350,000) for the construction of 10 new cod-fishing vessels during the Second Six-Year Development Plan. The 10 vessels will add about 9,000 metric tons of dried cod to the present production.

This estimate of cod-fishing fleet requirements is based upon a 1957 per capita consumption of cod of 8.4 kilograms (18.5 pounds) and an anticipated annual net population increase in continental Portugal of 56,000 people. The proposal estimates that by 1964 not less than 74,000 metric tons of dried cod must be made available to mainland consumers annually, of which the Portuguese cod-fishing industry should supply 63,800 metric tons. In view of the fact that national production during the 1957/58 season yielded 54,049 metric tons of dried cod, an 18-percent increase will be required to achieve the desired goal.

Of the 10 cod-fishing vessels to be launched by the end of the Second Development Plan, six are to be line trawlers and four other trawlers. The proposal takes notice of the tendency for advanced fishing countries to increase the tonnage of its fishing vessels for greater operating efficiency and comments that this argues in favor of building other trawlers rather than line trawlers. In the case of Portugal, however, because of the need to provide employment for "the great surplus of fishermen that exists along the Portuguese coast," plus the fact that a higher percentage of larger fish can be captured by trawl line methods, the decision was made to build both types of vessels.

Although no funds are earmarked for that purpose, the proposal states that, as a logical corollary to the development of the fishing fleet, three new cod-drying installations are to be constructed during the period of the plan. These three new installations, together with the five which already exist, would assure regularity in the supply of dried cod-fish.

The government concludes its proposal for improvements in the cod-fishing industry by stating that the industry should give prime consideration to the construction of a cod research and exploration vessel. Funds for the construction of such a vessel, the government says, would be supplied not only by the owners of the cod-fishing fleet and the various cod organizations, but also by other segments of the fishing industry.

**Trawl Fishing:** The otter trawl fishing industry supplies the Portuguese market with all types of fresh and frozen fish for domestic consumption, except sardines. The trawler fleet is made up of high-seas trawlers and coastal trawlers.

The government proposes an investment of 202 million escudos (US\$7,070,000) in the trawl fishing industry during the 1959-1964 period. This investment would result in the construction of ten high-seas trawlers and five coastal vessels.

At the present time, eight large high-seas trawlers are under construction and will be completed before the end of 1958. These vessels are not included in the Second Development Plan. These eight trawlers will have an annual production capacity of 14,400 metric tons of fish which, the proposal points out, is 30.2 percent of the total capacity of the present fleet. With the addition of the ten vessels to be constructed during the period of the second plan, the fleet will have a total annual production capacity of 83,636 metric tons. This constitutes an increase of 75.5 percent over the present annual capacity of the fleet.

Although some of the new ships to be constructed will replace others now in operation, since the new vessels are bigger, faster, and better equipped, the proposal anticipates a substantial increase in ability to capture greater quantities of fish under more economical conditions. In fact, the proposal points out that the goal set constitutes the maximum expansion that is practicable without resulting in overproduction.

As concerns coastal fishing, ten vessels are presently under construction and will be put into service during the 1957/58 fishing season. Five more vessels are to be constructed during the course of the Second Development Plan. The total annual capacity of these 15 vessels is estimated at 9,600 metric tons. Although the net increase in annual capacity of the coastal fishing fleet will be somewhat less than 9,600 metric tons because some of the new ships will replace older ones, the increase is considered to be the maximum permissible in view of the preliminary indications of overfishing on the continental shelf.

**Shellfish:** A total of 6 million escudos (US\$210,000) are to be invested in the development of the crustacean and bivalve industry. While no specific projects are elaborated, the general aim is to intensify the capturing of lobsters and other crustaceans and possibly to build an oyster-treating station should local demand warrant.

**Whaling Industry:** A total of 8 million escudos (US\$280,000) are to be invested in the whaling industry during the Second Development Plan. Part of these funds will be derived from loans and part will be investments by whaling ship-owners.

Of the total amount to be invested in the whaling industry, 6 million escudos (US\$210,000) will be used to acquire equipment for reduction of whaling byproducts. This equipment will be installed in vessels presently without it. The balance of the investments will go toward re-equipping the Terceira and San Miguel whaling zones in the Azores.

**Local Fishing:** So-called local fishing is carried on by individual owners of small craft in the immediate vicinity of the fishing ports. Each fisherman works on his own



## Portugal (Contd.):

account or in cooperation with a co-owner of the craft. The proposal notes that because of inadequate boats and means of capture these fishermen receive very mediocre and uncertain earnings. This type of fishing, the proposal observes, is important to Portugal primarily because of the number of fishermen involved--approximately 45,000. For this reason, and despite the fact that incomes are low, this type of fishing should not be discontinued.

Several of the organizations which are akin to fishermen's syndicates to date have granted loans to local fishermen for the purchase of motors and fishing gear and have established fish-selling services. Of 486 loans made during the first two years of the landing scheme, no difficulties in repayment have been encountered. Experience to date, however, had indicated that the 3,000-escudo (US\$105) loan ceiling is too low to enable local fishermen to build and repair boats, install motors, or buy gear. The proposal raises this ceiling to 6,000 escudos (US\$210) and sets the investment for this purpose at 6 million escudos (US\$210,000).

An additional sum of 6 million escudos is to be provided to enable local fishermen cooperatives to build new boats.

The development plan also provides for aid to the cod industry, the whaling industry, the inshore local fishery, and the shellfish industry, points out a United States Embassy dispatch from Lisbon, dated May 13.

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## FISHERIES TRENDS, APRIL 1958:

**Sardine Fishing:** During April 1958, the Portuguese fishing fleet landed 6,070 metric tons of sardines (valued at US\$336,000 ex-vessel or \$55.37 a ton). In April 1957, a total of 2,775 tons of sardines were landed (valued at US\$327,061).

Canneries purchased 24.0 percent or 1,456 tons of the sardines (valued at US\$81,000 ex-vessel or \$55.63 a ton) during April. Only 45 tons were salted, and the balance of 4,569 tons, or 75.3 percent of the total was purchased for the fresh fish market.

Matosinhos lead all other ports in April landings of sardines with 2,391 tons or 39.4 percent, followed by Setubal 1,650 tons (27.2 percent), and Peniche 971 tons (16.0 percent).

**Other Fishing:** The April 1958 landings of fish other than sardines consisted of 418 tons (value US\$55,652) of chinchard, and 477 tons (value US\$35,582) of anchovies. (*Conservas de Peixe*, June 1958.)



## Spain

## BILBAO FISHERIES TRENDS, MARCH-MAY 1958:

**Cod Fishing:** Two recently established cod-drying plants located in the inland province of Navarra have modernized and enlarged their installations to enable them to cure a combined total of 7,000

Landings of Fish by Vizcaya Fishing Fleet During March-May 1958	
	1,000 Lbs.
Anchovies . . . . .	26,800
Hake . . . . .	499
Other . . . . .	6,633
Total . . . . .	33,932

Note: Values converted at rate of 42 pesetas equal US\$1.

metric tons of cod per year. It has also been announced that they plan to import the fresh or wet-salted fish from abroad rather than from local sources because of the high prices which presently prevail in the Spanish market. A ton of wet-salted fish in Spain sells for 20,000 pesetas (US\$476), while the imported fish, including import duties plus transportation and insurance costs from Iceland or the Faroe Islands, amounts to 17,860 pesetas (US\$425) per ton. The imported fish, moreover, is both larger and better cured than the local product.

The Spanish cod fishing fleet operates on the banks off Newfoundland and Labrador where the cod is much smaller than that found in the waters off Iceland, Faroe Islands, and Norway. Because of the distance from its home port and the lack of fresh water on journeys lasting about three months, the Spanish fleet is not able to clean, store, and refrigerate newly-caught fish as well as those who set out to sea one day and return to port the next with their catches.

Wet-salted cod immediately after being caught, are split and breaded, thoroughly washed, and packed in salt. They are then stacked on piles 6-7 feet high, and after a period of one week the stack is turned over in order to drain off some of the excess water. The conversion of wet-salted fish into dried fish can be done by the sun-drying process or the hot-air evaporation method.

## Spain (Contd.):

In the first method the sun in northern climates during the late spring and summer months is well suited for drying or curing the wet-salted fish, which are placed on stone slabs for drying. The Icelandic trade name for dry fish is "Klipfisk" (stone fish). The sun slowly evaporates the excess water so that the Klipfisk contains about 42 percent moisture. This fish is whiter, has a better appearance, and tastes better than cod artificially cured by hot-air, the only drying process possible in Spain. This method is also utilized in Iceland, Norway, and the Faroe Islands when there is little sunshine. Drying by evaporation in hot-air tunnels requires about 3 to 4 days.

Spain produces approximately 50,000 tons of dried cod annually, and also imports 20,000 tons during the same period. All of the imported product enters Spain through the Port of Bilbao and is stored in warehouses in this city and in Barcelona. Last year the imported dry cod was purchased from the Faroe Islands (7,000 tons); Norway (6,000 tons); Iceland (4,000 tons); Newfoundland (2,000 tons); and Greenland (1,000 tons).

**Fish Landings:** During the months of March, April, and May of this year over 15,391 tons of fish, valued at approximately 76 million pesetas (US\$1.8 million), were caught within the province of Vizcaya as compared with 18,283 tons, worth about 81 million pesetas (US\$1.9 million), for the same period in 1957. The decrease this year was due to the scarcity of anchovies in local waters during March. In April they came in regularly and in great quantities, although not as much as in the neighboring ports in Santander province where canneries urgently hired farmers, housewives, mine workers, and children to handle the enormous quantities of anchovies.

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**VIGO FISHERIES TRENDS, MAY 1958:**

**Fish Exchange:** Landings at the Vigo, Spain, Fish Exchange amounted to 9.9 million pounds during May 1958, an increase of about 0.9 million pounds over the preceding month, and about the same amount above May 1957. The May 1958 landings were valued at US\$1,059,000, an increase of about 27 percent in value over May 1957. The increased value this May was due to the inflationary trend

in fresh fish prices and to larger catches of the more expensive species.

Leading species sold over the Fish Exchange were large and small hake (2.1 million pounds), horse mackerel (1.3 million pounds), and sardines (1.0 million pounds). Sardine landings increased 422 metric tons over the May 1957 figure of 20 tons.

**Fish Canning and Processing:** Fish canners were encouraged by the better catches of sardines and hake and hoped for further improvement over the relatively good 1957 landings in 1958. During May 1958 canners bought over the Exchange 438 metric tons of fresh fish, only 54 more tons than in April, but 268 more tons than in May 1957. Fish bought for drying, smoking, and salting, totaled 452 tons, an increase of 232 tons from April 1958 purchases.

**Tinplate Allocations:** At a recent intersyndical meeting (fruit, metal, fish, cattle, and olive syndicates) revisions were made in coefficients for the distribution of tinplate imports and domestic production. Tinplate ordered by canners using foreign exchange earned through their own exports was exempt from the new revision. At the moment, exporters draw from the Foreign Exchange Institute 20 percent of their foreign exchange earnings for their own commercial use. These new tinplate quotas are tentative, and subject to further study. The new revision is necessary because it was agreed in December 1957 that the agreement reached then was to be provisional. Also agreed was that imported tinplate which varied in price would be distributed equitably.

**Exports:** Under an accord between the Foreign Exchange Institute and the Rumanian State Bank (dated January 28, 1958), Spain will ship to that country \$500,000 worth of canned fish products. The accord will run for a period of one year.

**Landings 1957:** The National Economic Council estimates the Spanish fisheries landings at 810,182 metric tons for the year 1957, an index of 124.8 using the 1953/54 season as a base. This compares with an index of 116.6 in 1956 and 118.1 in 1955.

**Foreign Exchange:** Lack of machinery for modernization and tinplate fabrication continues to create an incessant demand on the part of the fishing and fish-canning industry for more foreign exchange. Members of the industry claim that they have done everything possible to augment production and accelerate modernization, and all that can be done now is to import new machinery. The only way to achieve this they say is to increase the premium now granted on exports (3 pesetas over the official rate of 42) to a level where it is more realistic, or at the free market rate.

**Local Taxes Affecting Fishing and Fish Canning Industry:** The "Tribunal Centencioso-Administrativo Provincial" in October 1957 approved the decision of the Ministry of the Treasury that the tax exemption on canned fish products be raised from 60 to 90 percent, and on cod from 60 to 100 percent. This was done to avoid double taxation on raw materials and processing by the provincial government, similar taxes having been imposed by the central and municipal governments.

Provincial inspectors have chosen to interpret the 90 percent figure as a maximum figure, leaving it to each fabricator to prove lot by lot that he has exhausted his 90 percent exemption on the net worth.

Lawyers for the industry maintain that the basic law reading "in no case shall the exemption be less than 40 percent" reveals the legislative intent, and that the new revision reading, "the exemption shall be 90 percent" should be interpreted in that light. Opinion is that the prima facie figure of 90 percent will be accepted administratively, and that recourse to the courts will not be necessary.

**Improvement of Markets:** In a recent article in the trade journal *Industria Conservera*, Spanish cooperation with the European Organization for Economic Cooperation was lauded as offering industry an opportunity for closer economic relations with the 17 participating coun-

### Spain (Contd.):

tries. The article stressed that Spain is not committed to a free exchange of goods, but only to enlarging present exchanges.

The magazine also discussed the possibilities of new markets for fish products behind the Iron Curtain. This great potential market, said the magazine, is another good reason for exporters to organize and present a united front, or the buyers (the Iron Curtain Countries), will have the bargaining advantage.

This theme of reorganizing the fishing and fish-canning industry is gaining more and more ground. Many people are of the opinion that something drastic must be done to reverse the downward trend which the industry has experienced in the last few years. Efforts must be made to organize so that the industry is no longer fragmented, individualized, and as the Spanish put it, atomized at the base. Recommendations are that more scientific practices must be used to reduce production costs, canners must concentrate on the faster selling items and publicize them adequately, containers must be standardized and the fabricators of them unite, and quality control must be stressed for those interested in wider foreign markets (United States Consul at Vigo, Spain, dispatch dated June 16, 1958).



### Surinam

#### SHRIMP FISHERY TRENDS, MAY 1958:

Problems of net repairs and a single vessel operation continued to beset the Surinam shrimp fishery in May. The *Coquette* made four trips with two nights of trawling for each trip. Catches for each trip were 450 pounds, 300 pounds, 140 pounds, and 220 pounds, respectively; a total of 1,110 pounds.

Work on the ice plant at the Paramaribo shrimp-processing plant continues and the refrigeration equipment is now on hand. Construction is expected to be completed in two months. Work on the pier has been started.

A United States citizen was in Surinam during this period looking over the shrimp fishing prospects. His discussions have indicated some interest in the Trinidad-Belem area, possibly using Paramaribo as a base.

The Director of the Surinam Fisheries Service and the local biologist working here for the Dutch Foundation, held a press conference early in June to discuss research results of the last year or so. Reference was made to the survey results of the U. S. Bureau of Commercial Fisheries exploratory fishing vessel *M/V Oregon* and the locally-owned

vessel *Coquette*, the United States Consul at Paramaribo reported on June 11, 1958.



### Sweden

#### COOPERATIVE ACTION IN SETTING FISHING LIMITS ADVOCATED:

Because of the recent Icelandic decree on the fixing of Iceland's fishing waters at 12 nautical miles, the Swedish Government on July 10 submitted a note of protest to the Icelandic Government. It draws the attention to its consistently upheld view that no state has the right to take unilateral action to extend its territorial waters beyond their present limit, said limit having been recognized by international law and that it may not establish additional zones in which it reserves special rights.

In the view of the Swedish Government measures taken in violation of these regulations constitute an infringement on the open seas, and the Swedish Government has continually felt obliged to lodge its protest and to reserve to itself its rights as soon as it learns of decrees or proclamations to this effect.

At the recently concluded Conference on the International Law of the Sea, the Swedish Government presented a proposal for universal control of territorial water limits, it is further said in the note. Leaving certain exceptional cases out of account, this proposal stated that every country could lay claim to maximum territorial waters of six nautical miles.

At the closing stage of the Conference the Swedish Government, in seeking to help reach a compromise settlement, felt that it could give its support to a United States proposal which granted states the right to claim territorial waters of six nautical miles and a fishing zone of six nautical miles outside these waters. This proposal, however, carried a proviso stipulating that countries, which in the past five years had conducted fishing within the said zone, had the right to continue such fishing. Inasmuch as the proposal was not adopted by the Conference, the Swedish Government has reverted to its previous standpoint.

## Sweden (Contd.):

The Swedish Government recommends that the measures which may be found desirable for the control of fishing in the areas under question should be principally achieved by cooperation between the states which conduct fishing in these waters and which therefore have a common interest in the matter. It therefore hopes that the Icelandic Government will consider the possibility of negotiations between the countries most directly concerned with the aim of reaching a solution satisfactory to all parties. (The Swedish-International Press Bureau, Stockholm, July 16, 1958.)



## Tunisia

**UNDERWATER LIGHTS FOR SARDINE FISHING FLEET PLANNED:**

The Government of Tunisia plans to equip all of its sardine fishing fleet with new-type underwater lights for night fishing. According to a report from an official of the Food and Agriculture Organization (FAO), it is expected that the proposed project--which is a result of underwater experiments performed with the assistance of FAO experts--will result in a considerable increase in the sardine catch and will also reduce the fishing fleet's expenditures by about \$2,800 per night of fishing.

The FAO representative in Tunisia stated that the Tunisian Government plans to equip one-third of its fishing fleet this year and the rest of the fleet next year. He added that during this year, the Government will equip some 30 or 40 vessels with Diesel generators and about 60 other vessels with the new-type underwater lights. Next year, he continued, the rest of the fleet will be equipped according to plan.

At present, approximately 1,000 Tunisian fishermen are engaged in sardine fishing at night. Government-supported loan facilities make it possible for the fishermen to buy the new equipment through fishery cooperatives.

During 1957, FAO fishery experts demonstrated to Tunisian fishermen

the methods of fishing with underwater lights.



## Union of South Africa

**PILCHARD-MAASBANKER INDUSTRY, JANUARY-MARCH 1958:**

With another good month in March, the Union of South Africa Cape west coast pilchard and maasbanker (jack mackerel) catch for the first quarter of 1958 totaled 57,640 metric tons--56,104 tons pilchards and 1,536 tons maasbanker. Also landed during the first three months of this year were 18,256 tons of mackerel.

Returns released by the Division of Fisheries show that 23,321 tons of pilchards, 77 tons of maasbanker, and 1,346 tons of mackerel were caught in March. These figures compare with 24,208 tons pilchards, 709 tons maasbanker, and 49 tons mackerel in March 1957; and 39,593 tons pilchards and 4,043 tons maasbanker in March 1956.

The March fish catch yielded 4,354 tons fish meal, 126,753 gallons fish body oil, 908,775 pounds canned pilchards, 768 pounds canned maasbanker, and 279,984 pounds canned mackerel.



## United Kingdom

**EXPORTS OF FROZEN COD FILLETS TO U. S. S. R. INCREASED:**

Quick-frozen cod fillets will be exported from the United Kingdom to the U. S. S. R. in larger quantities than originally expected. Early this year, a combination of eight firms located at the ports of Hull, Grimsby, and Fleetwood, contracted to export 4,000 long tons of frozen cod fillets between March 1 and September 1. This amount was then stepped up by 550 tons. Now, the contract has been extended by 1,500 tons, bringing the total amount to 6,050 tons.

It has been proposed that provision of the additional cod fillet exports should initially be divided between the Hull and Grimsby firms in the ratio of five to three,



**United Kingdom (Contd.):**

respectively, since the Fleetwood firms may not be able to supply more than the amount agreed to in the original contract. Thus, of the total amount exported under the new contract, Hull will supply about 57 percent, Grimsby about 35 percent, and Fleetwood, 8 percent.

Terms of the new contract have not yet been disclosed but it is understood that the ex-vessel price of the cod will be lower than the minimum summer price. Disposals of cod for freezing and export have been a means of absorbing unsold summer surpluses. (*The Fishing News*, July 11, 1958.)

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**FISH CATCH WILL BE SERIOUSLY AFFECTED BY 12-MILE FISHING LIMITS:**

In reply to questions raised in the British Parliament during the week of June 16, 1958, concerning the effect of the proposed Iceland and Faroe Islands 12-mile fishing limits, the British Minister of Agriculture, Fisheries, and Food stated that the effect would be very serious.

According to the Minister, about 40- to 50-percent of the British fish catch comes from fishing grounds around Iceland and the Faroes, and about 13-percent of the total catch is taken within the proposed 12-mile fishing limits.

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**PARLIAMENT RAISES QUESTIONS ON PROPOSED ICELANDIC FISHING LIMIT:**

On July 2 there were a number of questions in the British House of Commons addressed to the Foreign Secretary concerning unilateral actions by certain Governments, particularly Iceland, to extend territorial waters with respect to exclusive fishing zones. In his reply to these questions the Foreign Secretary stated that the British Government had made it absolutely clear that it would not accept unilateral declarations of this character and that any changes must be arrived at by negotia-

tion. He said that such negotiations might take the form of an international conference covering all the countries of the world, a regional conference, or bilateral negotiations. He also said that he was anxious to arrive at a solution of the problem by any one of these three methods of negotiation.

He added that the Icelandic regulations do not come into force until September 1958 and that it was the hope of the British Government that in the intervening time "we shall arrive at a mutually acceptable settlement by negotiation."

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**PROGRESS IN UNDER-WATER RESEARCH:**

One of the great difficulties about improving the performance of the fishing trawl is that everything has to be done by trial and error, for no one knows just how a trawl behaves on the bottom of the sea in deep water.

An underwater camera has, however, been developed and is now being carried by the Ministry of Agriculture, Fisheries and Food fishery research vessel *Ernest Holt*, which sailed with it in mid-June for the Bear Island fishing grounds on another scientific expedition.

The camera, which uses ordinary 35 mm. film, is fitted with electronic flash gear and devices which enable it to be set to take a series of pictures at fixed intervals. It can be set to be triggered off by a plummet device when it is the right distance above the sea bottom or it can be set to start taking pictures at any set depth.

Already most successful pictures have been taken of the bottom of the sea at 100 fathoms, and shoals of fish which had been detected by the echo-sounder have also been photographed and did not appear to have been disturbed by the momentary flashes.

At the moment the camera does not indicate the approximate size of the fish so pictured, but the device is being developed and there is little doubt that this slight drawback will be successfully overcome.

## United Kingdom (Contd.):

The camera opens up tremendous possibilities in deep-water fishery research work.

Among the exhibits at an exhibition of fishery research work held at Grimsby in mid-June was a most ingenious but almost ridiculously simple device for recording ocean currents at the bottom of the sea.

A bottle slightly smaller than a medicine bottle is partly filled with a kind of jelly which has a small compass floating in it. The bottle is dropped overboard from the research ship with a sinker to take it to the bottom and a line and buoy for subsequent recovery. The bottle floats just above the sea bottom and the velocity of the current tilts it as it is anchored.

The coldness of the water sets the jelly and when the bottle is recovered, the angle of tilt of the solidified jelly enables the scientists to measure the speed of the current, while the compass set in the jelly gives the direction.

Apart from the cost of the compasses, about US\$2 each, the cost is almost negligible and it works far better than the scientific instruments previously used which cost more than US\$840 each and were moreover not accurate on a research ship tossing and rolling in heavy seas.

In the past the Ernest Holt has had to determine the density in the fish shoals and even their presence by the trial method of experimental trawls. More recently, however, these trial hauls have been supplemented with echo-sounder observations, and from the experience gained the scientists are now obtaining the bulk of their information from the "echometer blips," thus being able to cover far more ground than by the old method.

This, however, has entailed a constant watch and the recording of all "blips" on the screen continuously for as long as a week. This work is of so exacting a nature that the scientists had to take short watches in turn at the instruments.

Now they have devised an apparatus to record the "blips" automatically and so release the highly-trained team of scientists from a wearisome, exhausting and exacting duty.

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#### REACTION TO ICELAND'S FISHING LIMITS EXTENSION:

Iceland's proposed extension of her territorial waters fishing limits from 4 to 12 miles effective September 1, 1958, was discussed at a meeting between representatives of the British Trawlers Federation and the Minister of Agriculture, Fisheries, and Food in London on June 5. A joint statement, issued after the meeting, which was also attended by the Minister of State for Foreign Affairs, said that the trawler owners emphasized that they would support any proposal for discussions "aimed at securing a just and lasting solution, in the interests of all concerned, to outstanding fishery problems in the north Atlantic," according to a press report of June 6, 1958.

The President of the British Trawlers Federation, who attended the meeting, said: "We believe that restraint must be exercised, and that in the end, to get any lasting solution, it must be done by consultation and discussion round a table. This cannot go on as a running sore."

The British Government had said that they would provide protection for fishing vessels operating within the Icelandic 12-mile limit. "I cannot discuss what form of protection would be provided," said the Federation President. "Certainly between now and September our members will fish where they normally do" (U. S. Embassy in London, June 1958 dispatch).

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#### WHITE FISH AUTHORITY LOAN INTEREST RATES REVISED:

The British White Fish Authority announced that as a result of recent changes in rates of interest charged to them by Her Majesty's Treasury, their own rates of interest were changed on loans as of June 6, 1958.

The new rates are: on loans of not more than 10 years,  $5\frac{1}{4}$  percent; on loans

## United Kingdom (Contd.):

for more than 10 years, but not more than 15 years, 6 percent; on loans for more than 15 years, 6½ percent.

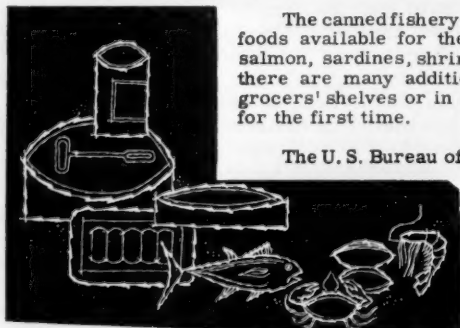
The new rates do not apply, however, where the final instalment of a loan, or interim instalments, in current cases, were paid by the Authority before June 6, 1958. The other terms and conditions of the Authority's arrangements for loans are unchanged.

The Authority's loans are connected with: the building of new fishing vessels of not more than 140 feet; the purchase, in certain circumstances, of new engines and nets and gear for inshore vessels; the construction of equipment and of processing plants; and the formation and development of cooperative organizations. (*Fish Trades Gazette*, British fishery trade periodical, of June 21, 1958.)



## SEPTEMBER--CANNED FOODS MONTH

This year's "September is Canned Foods Month" was sponsored by the canned foods industry. Fishery products play an important part in the canned foods industry.



The canned fishery products industry has a wide variety of delicious foods available for the housewife. While items such as canned tuna, salmon, sardines, shrimp, and clams are well known to nearly everyone, there are many additional and somewhat less known delicacies on the grocers' shelves or in speciality food stores for many consumers to try for the first time.

The U. S. Bureau of Commercial Fisheries lists the following items which are canned by the domestic fishing industry: king salmon, chum salmon, pink salmon, red salmon, silver salmon, steelhead salmon;

albacore tuna, bluefin tuna, skipjack tuna, yellowfin tuna, tonno tuna, and the tunalike fishes, bonito and yellowtail; alewives; mackerel; anchovies; shad; alewife roe; shad roe; cisco roe; groundfish roe; lumpfish caviar, sturgeon caviar, salmon caviar, whitefish caviar; blue crab, dungeness crab, king crab; soft clams, razor clams, hard clams; fish cakes; fish flakes; gefilte fish; smoked or kippered salmon, finnan haddie, sturgeon, and tuna with noodles, beans, sherry, vegetables, and shad; creamed sauces; clam spread, cakes, pie, sauce, soups, and stews; conch meat and chowder; crab cocktails, deviled, soft-shelled, smoked, spread, soups, and stews; lobster meat, knuckles, spread, soups, and stews; smoked oysters, and oyster stew; oyster bisque, cocktails, and soup; shrimp cocktails, soups, and stews; squid; terrapin and turtle meat, soup, and stews. Other specialties are: cod; herring; mullet; salmon livers; saury; wahoo; creamed finnan haddie, antipasto, and chowder; crawfish bisque; scallops in sauce; frog legs; sea mussels, and unclassified soups and stews.

In 1957, 644 million pounds of canned fishery products were packed in the United States and the Territories; worth over \$300 million to the packers.



Maine Sardine



Northern Anchovy



Pacific Mackerel



Horse Mackerel



White Shrimp



Dungeness Crab



Blue Crab



King Crab



# FEDERAL ACTIONS



## Federal Trade Commission

### NORTHWEST SEAFOOD CANNERS AND BROKERS CHARGED WITH MAKING ILLEGAL BROKERAGE PAYMENTS:

A number of Northwest packers and brokers of canned salmon and other seafood were charged during August by the Federal Trade Commission with making illegal brokerage payments to some customers in violation of Sec. 2(c) of the Clayton Act, as amended by the Robinson-Patman Act.

Named in separate complaints on August 18 were: one firm in Seattle, Wash. (complaint 7201), one packer in Bellingham, Wash. (complaint 7202), and one packer in Astoria, Ore. (complaint 7203). Each is charged with granting favored buyers discounts or allowances in lieu of brokerage. According to the complaints, the Astoria and Bellingham packers generally sell through primary brokers in the Seattle area, and also through field brokers who handle transactions in other areas. Both companies customarily pay primary brokers a 5-percent fee, and field brokers usually are paid 2½ percent commission by the Bellingham packer and varying amounts by the Astoria packer. In addition to selling its own pack, the Seattle packer acts as primary broker for other packers, usually through field brokers.

Both the Astoria and Bellingham packers, the complaints say, have made substantial sales to certain direct buyers without utilizing either type broker. The complaints allege that in many of these transactions they have given illegal price reductions approximating the brokerage fees which otherwise would have been paid.

The Astoria packer also has made occasional sales involving only field brokers and reduced the selling price by about the amount of the commissions which would have been earned by primary brokers, the complaint charges.

According to the complaint against the Seattle packer, this company has made unlawful payments by (1) allowing certain buyers, or their agents, price reductions offset wholly or partly by cutting the field broker's fee, and (2) granting price concessions reflecting brokerage where no brokers handle the sales.

Another Seattle packer (complaint 7209) was charged by the Commission on August 18 with giving illegal discounts on canned salmon to a large retail chain buyer. The complaint says the packer has made a substantial number of sales direct to "at least one" large chain at a lower net price reflecting the 5 percent brokerage normally paid to brokers for negotiating the firm's sales. The law prohibits paying or granting to buyers for their own account a discount or allowance in lieu of brokerage. This packer, the complaint says, is a

wholly-owned subsidiary of a Canadian corporation located at Vancouver, B. C.

In addition, a Seattle primary broker of seafood products (complaint 7204) was charged on August 18 by the Commission with granting illegal brokerage to some of its customers. A Commission complaint alleges that the owner of the firm has favored certain buyers, or their agents, with large allowances in lieu of brokerage through price concessions or rebates. A part or all of these unlawful rebates, the complaint says, were not charged back to his packer-principals but were taken from brokerage earned by the Seattle packer and the field brokers involved. (A field broker is employed to handle transactions in other marketing areas and usually is paid half of the Seattle broker's customary 5-percent brokerage fee.) The Seattle broker is alleged to have used these typical means to make the unlawful payments: (1) selling at net prices lower than those accounted for to his packer-principals; (2) granting price deductions by way of allowances, rebates, or other payments, wholly or partly not charged back to his packer-principals; and (3) making payments as or in lieu of brokerage to at least one agent of certain buyers, which came from his brokerage earnings and were not charged back.

The Commission on August 15 charged that a Hammond, Ore., packer and its Eastern broker at New York City (complaint 7210) have illegally favored certain buyers of the packing company's seafood pack by payments, allowances, or rebates in lieu of brokerage. The complaint alleges that both the packer and broker illegally did the following: (1) reduced net prices to favored buyers by approximately the same amount as the brokerage or commission on such sales, (2) gave favored buyers rebates or payments out of brokerage earnings for part of agreed advertising or promotional allowances, and (3) agreed to pass on a part of the brokerage in sharing price reductions granted to certain buyers in the form of promotional allowances. A second count of the complaint alleges that the Hammond packer violated Sec. 2(d) of the Robinson-Patman Amendment by giving \$50-per-month advertising and promotional allowances to a favored customer in Pennsylvania without offering its competitors proportionally equal payments. It also was alleged that the packer had agreed to a flat \$750 special advertising allowance to a favored customer in New Jersey. The complaint said that, of the \$750, the packer had paid \$500 and the broker had paid \$250. No such payments, the complaint said, were offered competing customers.

The granting of illegal price reductions in lieu of brokerage was charged by the Commission on August 18 in a complaint also against another Seattle seafood firm (complaint 7208). This Seattle firm, which is both a canner and distributor of seafood products, also negotiates sales of such products as a primary broker for packer-principals in



the Northwest, including the State of Alaska. When acting as a primary broker, it usually receives brokerage of 5 percent of the net selling price of the products by deducting the brokerage from the proceeds in its account of sale to its packer-principals. Field brokers acting for the firm usually get 2½ percent of the net selling price, although some get 3½ percent. The complaint charges that the firm has granted allowances in "substantial amounts" in lieu of brokerage to certain buyers for their own account. It also has made, the complaint says, substantial grants in lieu of brokerage by affording price concessions or rebates, a part or all of which were not charged back to packer-principals but were taken out of the firm's brokerage or the commission earnings of its field brokers.

In addition, on August 18 three seafood cannerys and their exclusive sales agent (complaint 7200) were charged on August 18 by the Commission with favoring chain-store buyers with prices reduced through illegal absorption of brokerage. The firms pack and sell canned salmon, tuna, crab meat, and clams. The complaint charges that the respondents have offered certain chain stores reduced prices which reflect brokerage or granted discounts and allowances in lieu of brokerage. This they did, the complaint alleged, either acting on their own or through their exclusive sales agent. The complaint charged further that the sales agent also favored illegally certain buyers when it was acting as primary broker for other seafood packers. This, the complaint said, was done (1) by selling at net prices less than those accounted for to its packer principals; (2) by giving allowances or rebates, a part or all of which were not charged back to its packer principals; and (3) by taking reduced brokerage or commissions on sales.

All the firms involved were granted 30 days in which to file answers to the complaints and a hearing before a Commission examiner were scheduled for each firm.

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#### **TWO SEATTLE SEAFOOD BROKERS DENY CHARGES OF MAKING ILLEGAL BROKERAGE PAYMENTS:**

Two Seattle primary brokers of canned salmon and other seafood products, on August 13 (answer 7151) and on August 25 (answer 7154), respectively, denied Federal Trade Commission charges of making illegal brokerage payments to favored customers.

In its complaint of May 20, 1958, the Commission alleged that one of the firms granted certain buyers substantial allowances in lieu of brokerage in violation of Sec. 2(c) of the Robinson-Patman Amendment to the Clayton Act. Typical methods cited by the complaint in making these payments were: (1) selling at net prices lower than those accounted for to packer principals; (2) granting price deductions, wholly or partly not charged back to the packers; and (3) taking reduced brokerage on sales involving price concessions. The firm's partners stated that "... they do not have sufficient knowledge or information to form a belief as to said allegations."

The Commission's complaint of May 26 charged the firm and its president, with violating Sec. 2(c) of the Amended Clayton Act by granting certain buyers rebates in lieu of brokerage or price concessions reflecting it. These illegal rebates, the complaint said, were either absorbed by the firm from its customary 5-percent brokerage fee, or shared by it and the field broker involved, out of the 2½-percent commission

each receives. Flatly denying these allegations, the respondents ask that the complaint be dismissed.

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#### **CONSENT ORDERS PROHIBIT SEATTLE SEAFOOD BROKERS FROM MAKING ILLEGAL BROKERAGE PAYMENTS:**

The Federal Trade Commission on August 11 approved consent orders (6977-6982 inclusive, canned seafood) prohibiting six Seattle, Wash., primary brokers of canned salmon and other seafood from making illegal brokerage payments to buyers.

The orders, agreed to by the brokers and the Commission's Bureau of Litigation, were contained in Hearing Examiner Joseph Callaway's separate initial decisions, which the Commission adopted.

Alleging violation of Sec. 2(c) of the Robinson-Patman Amendment to the Clayton Act, the Commission's complaints of December 12, 1957, charged all the brokers with granting certain buyers discounts or allowances in lieu of brokerage. In addition, two of them were charged with receiving brokerage fees on purchases made for their own accounts, and one was charged with granting allowances to field brokers purchasing for their own accounts. (Field brokers are selling agents employed by the primary brokers to handle transactions in market areas other than Seattle, and usually are paid half of the primaries' customary 5-percent brokerage fee.)

The complaints alleged that these brokerage firms give some buyers illegal price concessions and rebates in lieu of brokerage, and absorb these allowances out of brokerage earnings. Typical methods cited were selling at lower prices than those accounted for to their packer-principals, and granting rebates but not charging them back to the packers.

The order forbids these practices in the future. The agreements are for settlement purposes only and do not constitute admissions by the respondents that they have violated the law.



### **Department of the Interior**

#### **FISH AND WILDLIFE SERVICE**

#### **REVISED FISHERIES LOAN FUND REGULATIONS ISSUED:**

Revised regulations governing the granting of loans made from the Fisheries Loan Fund were issued and published in the Federal Register of August 13 as follows:

#### **TITLE 50—WILDLIFE**

##### **Chapter I—Fish and Wildlife Service, Department of the Interior**

##### **Subchapter J—Fisheries Loan Fund PART 160—LOAN PROCEDURES**

Notice was published in the FEDERAL REGISTER on June 30, 1958 (23 F. R. 4700) that pursuant to the authority vested in the Secretary of the Interior by section 4 of the Fish and Wildlife Act of 1956 (70 Stat. 1119, 1121; 16 U. S. C. sec. 742c), it was proposed to adopt the regulations

set forth below as a revision of Part 160—Loan Procedures. Interested persons were invited to submit in writing any comments, suggestions or objections relating to the proposed regulations within thirty days of the date of publication of the notice in the *FEDERAL REGISTER*. No comments, suggestions or objections were submitted within the thirty day period.

The purpose of this revision is to clarify the meaning of several sections of the regulations, to include fishery marketing cooperatives as qualified loan applicants, to delete the provision allowing a person using a fishing vessel or fishing gear under his control on a lease or share basis to be a qualified applicant for financial assistance, and to specify additional purposes for which applications for financial assistance cannot be considered.

The revised regulations are hereby adopted without change and are set forth below.

Dated: August 7, 1958.

FRED A. SEATON,  
Secretary of the Interior.

Sec.	Definition of terms.
160.1	Purposes of loan fund.
160.2	Interpretation of loan authorization.
160.3	Qualified loan applicants.
160.4	Basic limitations.
160.5	Applications.
160.6	Processing of loan applications.
160.7	Approval of loans.
160.8	Interest.
160.9	Maturity.
160.10	Security.
160.11	Books, records, and reports.
160.12	Penalties on default.

AUTHORITY: §§ 160.1 to 160.13 issued under sec. 4, 76 Stat. 1121; 16 U. S. C. 742c.

§ 160.1 *Definitions of terms.* For the purposes of this part, the following terms shall be construed, respectively, to mean and to include:

- Secretary.* The Secretary of the Interior or his authorized representative.
- Administrator.* Administrator of the Small Business Administration or his authorized representative.
- Person.* Individual, association, partnership or corporation, any one or all as the context requires.
- State.* Any State, the Territories and possessions of the United States, the Commonwealth of Puerto Rico, and the District of Columbia.

§ 160.2 *Purposes of loan fund.* The broad objective of the fisheries loan fund created by the Fish and Wildlife Act of 1956 is to provide financial assistance which will aid the commercial fishing industry to bring about a general upgrading of the condition of both fishing vessels and fishing gear thereby contributing to more efficient and profitable fishing operations.

(a) Under section 4 of the act, the Secretary is authorized, among other things:

(1) To make loans for financing and refinancing of operations, maintenance, replacement, repair and equipment of fishing gear and vessels, and for research into the basic problems of fisheries.

(2) Subject to the specific limitations in the section, to consent to the modification, with respect to the rate of interest, time of payment of any installment of principal, or security, of any loan contract to which he is a party.

(b) All financial assistance granted by the Secretary must be for one or more of the purposes set forth in paragraph (a) of this section.

§ 160.3 *Interpretation of loan authorization.* The terms used in the act to describe the purposes for which loans may be granted are construed to be limited to the meanings ascribed in this section.

(a) *Operation of fishing gear and vessels.* The words "operation of fishing gear and vessels" mean and include all phases of activity directly associated with the catching of fish and shellfish for commercial purposes.

(b) *Maintenance of fishing gear and vessels.* The words "maintenance of fishing gear and vessels" mean the normal and routine upkeep of all parts of fishing gear and fishing vessels, including machinery and equipment.

(c) *Replacement of fishing gear and vessels.* The words "replacement of fishing gear and vessels" contemplate the purchase of fishing gear or equipment, parts, machinery, or other items incident to outfitting for fishing to replace lost, damaged, worn, obsolete, inefficient, or discarded items of a similar nature, or the purchase or construction of a fishing vessel to operate the same type of fishing gear as a comparable vessel which has been lost, destroyed or abandoned or has become obsolete or inefficient. Any vessel lost, destroyed or abandoned more than two years prior to the date of receipt of the application shall not be considered eligible for replacement.

(d) *Repair of fishing gear and vessels.* The words "repair of fishing gear and vessels" mean the restoration of any worn or damaged part of fishing gear or fishing vessels to an efficient operating condition.

(e) *Equipment of fishing gear and vessels.* The words "equipment of fishing gear and vessels" mean the parts, machinery, or other items incident to outfitting for fishing which are purchased for use in fishing operations.

(f) *Research into the basic problems of fisheries.* The words "research into the basic problems of fisheries" mean investigation or experimentation designed to lead to fundamental improvements in the capture or landing of fish conducted as an integral part of vessel or gear operations.

§ 160.4 *Qualified loan applicants.* (a) Any person residing or conducting business in any State shall be deemed to be a qualified applicant for financial assistance if such person:

(1) Owns a commercial fishing vessel of United States registry (if registration is required) used directly in the conduct of fishing operations, irrespective of the type, size, power, or other characteristics of such vessel;

(2) Owns any type of commercial fishing gear used directly in the catching of fish or shellfish;

(3) Owns any property, equipment, or facilities useful in conducting research into the basic problems of fisheries or possesses scientific, technological or other skills useful in conducting such research.

(4) Is a fishery marketing cooperative engaged in marketing all catches of fish or shellfish by its members pursuant to contractual or other enforceable ar-

rangements which empower the cooperative to exercise full control over the conditions of sale of all such catches and disburse the proceeds from all such sales.

(b) Applications for financial assistance cannot be considered if the loan is to be used for:

(1) Any phase of a shore operation.

(2) Refinancing existing preferred mortgages or secured loans on fishing gear and vessels, except in those instances where the Secretary deems such refinancing to be desirable in carrying out the purpose of the Act.

(3) Paying creditors for debts previously incurred, except for marshalling and liquidating the indebtedness of the applicant to existing lien holders in those instances where the Secretary deems such action to be desirable in carrying out the purpose of the Act.

(4) (i) Effecting any change in ownership of a fishing vessel (except for replacement of a vessel or purchase of the interest of a deceased partner), (ii) replenishing working capital used for such purpose or (iii) liquidating a mortgage given for such purpose less than two years prior to the date of receipt of the application.

(5) Replacement of fishing gear or vessels where the applicant or applicants owned less than a 20 percent interest in said fishing gear or vessel to be replaced or owned less than 20 percent interest in a corporation owning said fishing gear or vessel: *Provided*, That applications for a replacement loan by an eligible applicant cannot be considered unless and until the remaining owners or shareholders shall agree in writing that they will not apply for a replacement loan on the same fishing gear or vessel.

(6) Repair of fishing gear or vessels where such fishing gear or vessels are not offered as collateral for the loan by the applicant.

(7) Financing new business ventures involving fishing operations.

§ 160.5 *Basic limitations.* Applications for financial assistance may be considered only where there is evidence that the credit applied for is not otherwise available on reasonable terms (a) from applicant's bank of account, (b) from the disposal at a fair price of assets not required by the applicant in the conduct of his business or not reasonably necessary to its potential growth, (c) through use of the personal credit and/or resources of the owner, partners, management, affiliates or principal stockholders of the applicant, or (d) from other known sources of credit. The financial assistance applied for shall be deemed to be otherwise available on reasonable terms unless it is satisfactorily demonstrated that proof of refusal of the desired credit has been obtained from the applicant's bank of account: *Provided*, That if the amount of the loan applied for is in excess of the legal lending limit of the applicant's bank or in excess of the amount that the bank normally lends to any one borrower, then proof of refusal should be obtained from a correspondent bank or from any other lending institution whose lending capacity is adequate to cover the loan applied for. Proof of refusal of the credit applied for must contain the date, amount, and terms requested. Bank refusals to advance credit will not be considered the

full test of unavailability of credit and, where there is knowledge or reason to believe that credit is otherwise available on reasonable terms from sources other than such banks, the credit applied for cannot be granted notwithstanding the receipt of written refusals from such banks.

**§ 160.6 Application.** Any person desiring financial assistance from the fisheries loan fund shall make application to the Fish and Wildlife Service, Department of the Interior, Washington 25, D. C., on a loan application form furnished by that Service except that, in the discretion of the Secretary, an application made other than by use of the prescribed form may be considered if the application contains information deemed to be sufficient. Such application shall indicate the purposes for which the loan is to be used, the period of the loan, and the security to be offered.

**§ 160.7 Processing of loan applications.** If it is determined, on the basis of a preliminary review, that the application is complete and appears to be in conformity with established rules and procedures, a field examination shall be made. Following completion of the field investigation the application will be forwarded with an appropriate report to the Fish and Wildlife Service, Department of the Interior, Washington 25, D. C.

**§ 160.8 Approval of loans.** Loan agreements shall be executed on a form approved by the Secretary. The Secretary will evidence his approval of the

loan by issuing a loan authorization covering the terms and conditions for making the loan. Such loan authorization shall be referred to the Administrator who will direct the closing of the loan with the applicant in the field and render services involving the collection of repayments and such other loan servicing functions as may be required. Any modification of the terms of a loan agreement following its execution must be agreed to in writing by the borrower and the Secretary.

**§ 160.9 Interest.** The rate of interest on all loans which may be granted is fixed at five per cent per annum.

**§ 160.10 Maturity.** The period of maturity of any loan which may be granted shall be determined and fixed according to the circumstances but in no event shall the date of maturity so fixed exceed a period of ten years.

**§ 160.11 Security.** Loans shall be approved only upon the furnishing of such security or other reasonable assurance of repayment as the Secretary may require. The proposed collateral for a loan must be of such a nature that, when considered with the integrity and ability of the management, and the applicant's past and prospective earnings, repayment of the loan will be reasonably assured.

**§ 160.12 Books, records, and reports.** The Secretary shall have the right to inspect such books and records of the applicant as the Secretary may deem necessary. Disbursements on a loan made

under this part shall be made only upon the agreement of the loan applicant to maintain proper books of account and to submit such periodic reports as may be required by the Secretary during the period of the loan. During such period, the books and records of the loan applicant shall be made available at all reasonable times for inspection by the Secretary.

**§ 160.13 Penalties on default.** Unless otherwise provided in the loan agreement, failure on the part of a borrower to conform to the terms of the loan agreement will be deemed grounds upon which the Secretary may cause any one or all of the following steps to be taken:

(a) Discontinue any further advances of funds contemplated by the loan agreement.

(b) Take possession of any or all collateral given as security and the property purchased with borrowed funds.

(c) Prosecute legal action against the borrower.

(d) Declare the entire amount advanced immediately due and payable.

(e) Prevent further disbursement of and withdraw any funds advanced to the borrower and remaining under his control.

These regulations shall become effective thirty days after date of publication in the FEDERAL REGISTER.

Issued at Washington, D. C., and dated August 7, 1958.

FRED A. SEATON,  
Secretary of the Interior.

Note: Also see Commercial Fisheries Review, August 1958, p. 91.



## Committee for Reciprocity Information

### STATEMENTS INVITED FOR FALL GATT CONSULTATIONS ON IMPORT RESTRICTIONS:

Views were invited from United States traders, business firms, labor organizations, and individuals or associations which have an interest in exporting to certain countries which are to meet in Geneva on October 16 during the Thirteenth Session of the GATT. The consulting countries were expected to be Australia, Ceylon, Ghana, Malaya, United Kingdom, and the Federation of Rhodesia and Nyasaland. The first five have been important markets for United States fishery products, but this trade has been adversely affected by import restrictions imposed by those countries in recent years.

The consultations will center around the application of import restrictions maintained for balance-of-payments reasons by certain of the GATT contracting parties. During the consultations these parties will (1) review each consulting country's financial and economic situation; (2) discuss opportunities for relaxation of import restrictions. They will also explore the possibilities for moderating practices and policies which are burdensome to exporters.

Written statements setting forth trade problems in the consulting countries were to be submitted before September 15, 1958, to the Committee for Reciprocity Information, Washington 25, D. C.



## Eighty-Fifth Congress (Second Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions, hearings, and other chamber actions by the House and Senate, as well as signature into law or other final disposition are covered.



The Second Session of the Eighty-Fifth Congress adjourned sine die on August 24, 1958. Bills introduced in either the first or second session of the 85th Congress which failed to pass during either session will have to be reintroduced in the 86th Congress (which convenes in January 1959) if they are to be considered and acted upon.

**ANTIDUMPING ACT OF 1921:** H. R. 6006, a bill to amend the Antidumping Act of 1921, and for other purposes. The conference report on this bill was accepted by the Senate on August 4 and by the House on August 7, and the bill was cleared for the President. The bill was signed by the President on August 14, 1958 (P. L. 85-630).

Principally, the legislation writes into the Antidumping Act a new set of definitions for use in determining the value of imported merchandise, so that the Bureau of Customs will be enabled to utilize similar standards in the calculation of ordinary duties and dumping duties. Under the Act, whenever the Secretary of the Treasury determines that a class or kind of foreign merchandise is being or is likely to be sold in the United States at less than its fair value, he is required to so advise the Tariff Commission. Within three months, the Commission is required to determine whether an industry in the United States is being or is likely to be injured, or is being prevented from being established, by reason of the importation of such merchandise. Under P. L. 85-630, the Commission will be deemed to have made an affirmative finding if the Commissioners are evenly divided, and the findings of the Treasury Department and the Tariff Commission must be published. Whenever there has been a determination that imported merchandise is being sold at less than fair value and that such sales are or are likely to be injurious to domestic industry, the dumping duties to be collected are to be equal to the amounts by which the prices paid for the goods by American purchasers are less than the foreign market values (first, the price at which sold or offered for sale in the principal markets of the country from which exported, or second the price at which sold or offered for sale for home consumption) or the constructed value. The amendments to the Act made by P. L. 85-630 define the terms to be used in making such valuations.

H. Rept. No. 2352, Antidumping Act, 1921 (August 1, 1958, 85th Congress, 2nd Session, to ac-

company H. R. 6006), 3 pp., printed. Presents the report and recommendations of the Committee on Conference on the disagreement of the two houses on the amendments to the bill.

**CHEMICAL ADDITIVES IN FOOD:** H. R. 13254 to protect the public health by amending the Federal Food, Drug, and Cosmetic Act so as to provide for the safety of chemical additives in food, was reported favorably by the House Interstate and Foreign Commerce Committee (H. Rept. 2284) on July 28. Under suspension of rules the bill passed the House on August 13.

H. R. 13254 was reported in the Senate on August 18 by the Senate Labor and Public Welfare Committee (S. Rept. 2422). The bill was passed over by the Senate on August 20 when it came up on the calendar. Senator Dirksen on the same day also submitted amendments, intended to be proposed by him, and they were ordered to lie on the table and to be printed. Passed by the Senate with amendments August 22. Signed by the President September 6, 1958 (P. L. 85-929).

The House on August 23 cleared H. R. 13254 for Presidential action after it voted to agree to Senate amendments.

S. Rept. No. 2422, Food Additives Amendment of 1958 (August 18, 1958, 85th Congress, 2nd Session, to accompany H. R. 13254), 19 pp., printed. This report of the Senate Committee on Labor and Public Welfare contains an explanation of the bill; its history and principal provisions; the report of the Secretary of Health, Education, and Welfare on the companion bill S. 4193; explains the amendments to the bill made by the Committee; and presents the sections of Acts now in effect as they would be changed by the bill.

H. Rept. No. 2284, Food Additives Amendment of 1958 (July 28, 1958, 85th Congress, 2nd Session, to accompany H. R. 13254), 28 pp., printed. House Committee on Interstate and Foreign Commerce in this favorable report points out the purpose, history, principal provisions, and changes in existing law.

The Act has as its objective the correction of two deficiencies in the existing laws to assure the safety of the foods sold. In the first place, requires the processor of foodstuffs who proposes to add to the food any new chemical additive to first prove that the proposed addition will be safe. Under present law the burden of proving any particular additive poisonous or deleterious to humans lies with the Food and Drug Administration. This Act requires that no new additives be used without their safety having first been established. The burden of proof is placed on the concern which intends to add the chemical to the food.

The second change in existing law permits American industry to promote new technological developments in food handling calculated to make foods more tasteful and appetizing, to enable them to be kept longer, or to otherwise improve them, through the use of additives now proscribed under a blanket provision of existing law. This Act, which has the approval of the Food and Drug Administration, would permit the use of additives at safe levels in order to advance food technology.



**DISTRICT OF COLUMBIA FISH AND GAME LAWS:** S. 532, a bill to revise and modernize the fish and game laws of the District of Columbia, and for other purposes. The House Committee on the District of Columbia reported H. R. 10160 similar to S. 532 on August 7, 1958, and on August 12 passed S. 532 in lieu of H. R. 10160. The bill authorizes the Board of Commissioners of the District of Columbia to promulgate appropriate regulations to revise and modernize the fish and game laws of the District of Columbia. The bill (S. 532) was passed by the Senate with amendments on March 17, 1958. S. 532 was cleared for the President and signed August 23, 1958 (P. L. 85-730).

H. Rept. No. 2522, Revising and Modernizing the Fish and Game Laws of the District of Columbia (August 7, 1958, 85th Congress, 2nd Session, to accompany H. R. 10160), 8 pp., printed. This report of the House Committee on the District of Columbia analyzes the bill section by section and points out the changes in existing law.

**DOGFISH SHARK BOUNTY:** H. R. 13478 (Pelly) introduced in the House on July 21, 1958, a bill to provide for payment of bounties on dogfish sharks to control the depredations of this species on the fisheries of the Pacific Coast; to the Committee on Merchant Marine and Fisheries.

S. 2719 (Magnuson) introduced in the Senate on July 8, 1958, a bill to provide for the payment of bounties for the control of certain predators on salmon and halibut of the Pacific coast and Alaska. Predators named are dogfish sharks, lamprey eels, hair seals, and sea lions. Reported in Senate by the Interstate and Foreign Commerce Committee on July 28 (S. Rept. 1979). Passed the Senate on July 31.

H. J. Res. 678 (Tollefson) introduced in the House on August 7, 1958, authorizing and directing the Secretary of the Interior to investigate and eradicate the predatory dogfish sharks and to provide for the payment of bounties on dogfish sharks to control the depredations of this species on the fisheries of the Pacific coast, and for other purposes. Provides for investigations of the abundance and distribution of dogfish sharks, experiments to develop control measures, and a program of elimination and eradication; also provides for the payment of a bounty on dogfish sharks. Also H. J. Res. 697 (Pelly) introduced in the House on August 13, 1958, similar to H. J. Res. 678.

S. Rept. No. 1979, Bounties on Dogfish Sharks (July 28, 1958, 85th Congress, 2nd Session, to accompany S. 2719), 7 pp., printed. This report from the Senate Committee on Interstate and Foreign Commerce discusses the purpose of the bill and presents the comments of several Federal agencies.

House Committee on Merchant Marine and Fisheries on August 14 reported S. 2719, with amendment (H. Rept. No. 2628). Passed by the House as amended on August 22, 1958, and returned to the Senate for concurrence.

The Senate on August 23 cleared S. 2719, by concurring in House amendments. As amended by

the House, the bill does not provide for the payment of bounties. It authorizes the Secretary of the Interior, for a period of not to exceed 4 years from the date of approval of the act, to conduct investigations of the abundance and distribution of dogfish sharks, experiments to develop control measures, and a program for the elimination and eradication or development of economic uses of dogfish. Not to exceed \$95,000 a year is authorized to be appropriated to carry out the purposes and objectives of the bill.

H. Rept. No. 2628, Authorizing and Directing the Secretary of the Interior to Investigate and Eradicate the Predatory Dogfish Shark (August 14, 1958, 85th Congress, 2nd Session, to accompany S. 2719), 2 pp., printed. This report from the Committee on Merchant Marine and Fisheries explains the purpose of the bill and shows the amendment which provides for a study of the dogfish shark but eliminates the bounty provided by the bill as originally introduced.

Sent to the President for signature August 25, 1958, and signed by him September 2, 1958 (P. L. 85-887).

**EXEMPT TRUCK USE:** S. 3778, a bill to amend the Interstate Commerce Act so as to strengthen and improve the national transportation system, includes an exemption for fresh and frozen fishery products from I. C. C. motor carrier regulations. House asked for a conference on this bill on June 27, 1958. A conference report was filed July 24, 1958 (H. Rept. 2274).

H. Rept. No. 2274, Transportation Act of 1958 (July 24, 1958, 85th Congress, 2nd Session, to accompany S. 3778), 16 pp., printed. Report and recommendations of Committee of Conference on disagreements of the two houses to amendments to S. 3778. The conferees recommended with respect to the exemption from regulation of motor carrier transportation that exempted from economic regulation is the transportation of "cooked or uncooked (including breaded) fish or shellfish when frozen or fresh, but not including fish and shellfish which have been treated for preserving, such as canned, smoked, pickled, spiced, corned, or kippered products."

Senate and House agreed to conference report on July 30, 1958, and the bill was cleared for Presidential action. The President signed the bill on August 12, 1958 (P. L. 85-625).

Known as the "Transportation Act of 1958," it contains the provision that exempted from economic regulation is the transportation of cooked or uncooked (including breaded) fish or shellfish when frozen or fresh (but not including fish and shellfish which have been treated for preserving, such as canned, smoked, pickled, spiced, corned, or kippered products). . . . This language plus the colloquy on the floor of the Senate on June 11 between Senators Smathers and Kennedy clearly indicates the intent of Congress that "such fishery products as codfish cakes, deviled crab, fish with sauce, fish dinners and similar seafood products, even though they are shown as 'non exempt' in I. C. C. Rule #107" are

exempt from I. C. C. regulated motor carrier regulations. Although the original House version listed salted fish as one of the preserved products not entitled to exemption, the Conference Committee deleted "salted" from the final language and, therefore, it is also exempt.

**FISH AND WILDLIFE DEVELOPMENT AID IN WATERSHED PROTECTION AND FLOOD PREVENTION PROJECTS:** H. R. 5497, a bill to amend the Watershed Protection and Flood Prevention Act to provide for financial assistance to local organizations for the institution of works of improvement for recreational and fish and wildlife development. This bill reported by the House Agriculture Committee on August 5, 1957 (H. Rept. 990). Passed by the House on February 17, 1958. S. 1164, similar to H. R. 5497, was passed over by the Senate August 23, 1958. H. R. 5497 was reported in the Senate May 26, 1958, by the House Agriculture and Forestry Committee (S. Rept. 1630). Passed by the Senate, amended, August 18, 1958. House agreed to Senate amendments August 20, 1958, and the bill was cleared for Presidential action. It was signed September 2, 1958 (P. L. 85-865).

S. Rept. No. 1630, Recreational aspects of Watershed Protection Projects (May 26, 1958, 85th Congress, 2nd Session, to accompany H. R. 5497), 4 pp., printed. Report from the Senate Committee on Agriculture and Forestry, which repeats the explanation of the bill contained in the report from the House Committee on Agriculture.

**FISH AND WILDLIFE SERVICE SUPPLEMENTAL APPROPRIATIONS:** H. R. 13450, a bill making supplemental appropriations for the fiscal year ending June 30, 1959, and for other purposes, includes supplemental funds for certain Fish and Wildlife Service activities. Reported by the House Committee on Appropriations July 18, 1958 (H. Rept. No. 2221). Bill was passed by the House July 22, 1958.

H. R. 13450 was reported in the Senate by the Committee on Appropriations on August 13, 1958 (S. Rept. 2350). Passed Senate, amended, August 15, 1958. Senate asked for a conference August 15, 1958. House agreed to a conference August 18. Conference report filed August 19 (H. Rept. 2677). House agreed to conference report August 20. House receded and concurred in certain Senate amendments, but insisted on its disagreement to certain Senate amendments on August 20, 1958.

H. Rept. 2221, Supplemental Appropriation Bill, 1959 (July 18, 1958, 85th Congress, 2nd Session, to accompany H. R. 13450), 62 pp., printed. This report from the Committee on Appropriations presents a summary of the bill, and in detail presents the supplemental funds to be provided for various agencies, including the Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries of the United States Fish and Wildlife Service, and the Outdoor Recreation Resources Review Commission.

S. Rept. 2350, The Supplemental Appropriation Bill, 1959 (August 13, 1958, 85th Congress, 2nd Session, to accompany H. R. 13450), 66 pp., printed. This report from the Committee on Appropriations gives details on the funds to be provided for

various agencies, including the Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries, and the Outdoor Recreation Resources Review Commission.

H. Rept. 2677, Supplemental Appropriation Bill, 1959 (August 19, 1958, 85th Congress, 2nd Session, to accompany H. R. 13450), 14 pp., printed. Presents the recommendations of the Committee of Conference.

H. Rept. 2686, Supplemental Appropriation Bill, 1959 (August 21, 1958, 85th Congress, 2nd Session, to accompany H. R. 13450), 2 pp., printed. Presents the recommendations of the Committee of Conference on two amendments on which there still was disagreement.

H. R. 13450 was cleared for the President's signature, on August 21, when Senate adopted further conference report thereon and adopted to concur in House amendment in disagreement. Further conference report on H. R. 13450 was filed on the same day in the House (H. Rept. 2686). After further discussions on certain disagreements on amendments, the House suspended the rules and agreed to the conference report, and sent the bill to the Senate. Conferees had previously agreed to file a second conference report on the differences between the Senate- and House-passed versions. This bill includes funds to finance for six months the inspection and certification services for fish, shellfish, and related products (\$85,000) as finally agreed upon by both houses; funds for the administration of the Alaska game law and Alaska fisheries; and funds for the Outdoor Recreation Resources Review Commission.

For the Outdoor Recreation Resources Review Commission, the House amended the amount provided from \$100,000 to \$50,000. Senate in adopting conference report on H. R. 13450 concurred in House amendments on the funds for the Commission.

**FISHERIES ASSISTANCE ACT OF 1958:** S. 3229 (Saltonstall), a bill to provide a five-year program of assistance to enable depressed segments of the fishing industry in the United States to regain a favorable economic status, and for other purposes. Amendments (in the nature of a substitute) were introduced on July 16, 1958, and referred to the Committee on Interstate and Foreign Commerce. The amended bill would provide for the following: (1) An increase of \$10 million to the fisheries loan fund. The Secretary of the Interior would be authorized to make loans under more liberal conditions and for terms of not more than 20 years. In addition, the Secretary would be authorized to reduce any of the terms and requirements for repayment of loans previously granted. (2) appropriate the sum of \$5 million to be used by the Secretary in making loans to processors of fishery products within segments of the fishing industry found by the Secretary to be in a distressed condition. Such loans shall be made for the improvement and modernization of plants and upon terms of not more than 20 years and at interest rates of not less than 3 percent. (3) Subject to the specific limitations and under such terms and conditions as he may prescribe, the Secretary may pay to or cause to be paid on behalf of any fishing vessel owner a construction-differential subsidy to aid in the construction of new fishing vessels. No such subsidy shall be paid by the Secretary until he determines: that the applicant will aid in the development and improvement of the fishery trade and will declare his readiness to use his new vessel in the fisheries intended to be aided by this Act; that the applicant possesses the ability, experience, financial resources, and other qualifications necessary to enable him to operate and maintain the proposed new vessel; and that the applicant is engaged in the fishery trade within segments

of the fishing industry found by the Secretary to be in a distressed condition.

The construction-differential subsidy payable by the Secretary may equal, but not exceed, the excess of the bid of the shipbuilder constructing the proposed vessel, over the fair and reasonable estimate of cost, as determined by the Secretary, of the construction of the proposed vessel if it were constructed under similar plans and specifications in a foreign shipbuilding center which is deemed by the Secretary to furnish a fair and representative sample for the determination of the estimated foreign cost of construction of vessels of the type proposed to be constructed. The construction-differential approved by the Secretary shall not exceed 33-1/3 percent of the construction cost of the vessel, except that in cases where the Secretary possesses convincing evidence that the actual differential is greater than that percentage, the Secretary may approve an allowance not to exceed 50 percent of such cost. The sum of \$10 million to carry out the provisions of the vessel construction subsidy is authorized. (4) The Secretary may pay or cause to be paid, under such terms and conditions as he may prescribe, to or on behalf of any fishing vessel owner a construction differential subsidy to aid in the reconstructing or reconditioning of any fishing vessel where such reconstruction or reconditioning is for the purpose of modernizing the fishing vessel, rendering it more safe, or improving the overall efficiency of such a vessel. No such subsidy shall be paid by the Secretary until he determines: that the applicant will aid in the development and improvement of the fishery trade and will declare his readiness to use his vessel in the fisheries intended to be aided by this Act; that the applicant possesses the ability, experience, financial resources, and other qualifications necessary to enable him to operate and maintain the vessel, and that the applicant is engaged in the fishery trade within segments of the fishing industry found by the Secretary to be in a distressed condition. The reconstruction-differential subsidy payable by the Secretary for the purpose of reconstructing or reconditioning any fishing vessel shall not exceed 33-1/3 percent of the fair and reasonable estimate of the cost of such reconstruction and reconditioning: PROVIDED, That if the Secretary shall determine that the reconstruction or reconditioning, if completed in a foreign shipbuilding center, would exceed the fair and reasonable estimate of the cost as determined by the Secretary, the Secretary may approve an allowance not to exceed 50 percent of such cost. The sum of \$5,000,000 would be authorized to carry out these reconstructing or reconditioning provisions.

(5) Amend the title so as to read: "A bill to supplement the Fish and Wildlife Act of 1956, and for other purposes."

The amended version of S. 3229 was reported in the Senate on August 12, 1958, by the Committee on Interstate and Foreign Commerce (S. Rept. 2334).

S. Rept. No. 2334, Fisheries Assistance Act of 1958 (August 12, 1958, 85th Congress, 2nd Session, to accompany S. 3229), 15 pp., printed. This report from the Senate Committee on Interstate and Foreign Commerce explains the purpose of the bill; presents certain pertinent data on the fishing industry in general and New England in particular, fish prices, and fishermen's operating costs in Alaska; discusses the bill as amended; presents comments from various Federal Government agencies; and also the dissenting views of two members of the Committee.

Also H. R. 13528 (MacDonald) was introduced in the House on July 27; similar to amended version of S. 3229.

Failed to pass after it was passed over by the Senate on August 23, 1958.

Senator Saltonstall on the floor of the Senate on August 15 called attention to the need for aid for the New England groundfish industry and the status

of S. 3229. In his statement he pointed out: "... It is with great disappointment that I must report to the Senate the demise of proposed legislation to aid this critically distressed and vitally important American industry.

"The House Committee on Merchant Marine and Fisheries yesterday tabled the Federal Fisheries Assistance Act of 1958, a companion bill which is now on the Senate Calendar. . . .

"Unfortunately, Mr. President, this proposed legislation will not be enacted during the 85th Congress. But conditions in the industry may soon deteriorate to a point where assistance by the Government will be too late. On behalf of the New England delegation, in both the House and the Senate, I state emphatically that in January we will renew our efforts to obtain the enactment of legislation which will be of benefit to this vital industry, which has had to take some very hard blows in the interests of the national security."

An amendment, intended to be proposed by Senator Lausche (for himself and Mr. Thurmond) jointly, was submitted to S. 3229 to provide a 5-year program of assistance to enable depressed segments of the fishing industry in the United States to regain a favorable economic status, and for other purposes. The amendment was ordered to lie on the table, and to be printed.

Companion house bills on which hearings were held have not been reported out by the House Committee on Merchant Marine and Fisheries.

**FISHERY EXTENSION SERVICE:** S. 2973, a bill to authorize the Secretary of the Interior to establish a fishery extension service in the Fish and Wildlife Service of the Department of the Interior for the purpose of carrying out cooperative fishery extension work with the States, Territories, and possessions, was the subject of hearings by the Senate Interstate and Foreign Commerce Committee on July 16, 1958. The Committee reported the bill to the Senate on July 30, 1958 (S. Rept. 2063). On August 4, 1958, the bill was passed by the Senate as amended. It was referred to the House Merchant Marine and Fisheries Committee on August 5, 1958.

S. Rept. No. 2063, Establishing a Fishery Extension Service (July 30, 1958, 85th Congress, 2nd Session, to accompany S. 2973), 7 pp., printed. This report from the Committee on Interstate and Foreign Commerce discusses the purpose of the bill, the type of extension service contemplated, and the need for the legislation. The report also gives the Committee amendments and presents the reports of other Federal Departments.

Failed to pass.

**FISHING VESSEL RIGHTS ON HIGH SEAS:** S. 1483, to amend the act of August 27, 1954, relating to the rights of vessels of the United States on the high seas and in the territorial waters of foreign countries, was passed over by the Senate on August 23. Failed to pass.

**HAWAII STATEHOOD:** H. R. 49, a bill to provide for the admission of the State of Hawaii into the Union, with amendment, was reported to the

House by the Interior and Insular Affairs Committee on August 23 (H. Rept. No. 2700). Failed to pass. S. 50, companion bill to H. R. 49 in the Senate, was passed over by that body on August 23 and 30, 1958, and failed to pass.

H. Rept. No. 2700, Hawaii Statehood (August 23, 1958, 85th Congress, 2nd Session, to accompany H. R. 49), 78 pp., printed. This favorable report of the House Interior and Insular Affairs Committee lists the Committee's amendments; discusses the background, history, and major provisions of the legislation; presents data on Hawaii and statements by various Federal agencies; contains the Constitution of the State of Hawaii, changes in existing law, and a minority report.

**IMPORTS OF POLLUTED SHELLFISH PROHIBITED:** S. 4245 (Jackson and others), a bill to prohibit the importation into the United States of polluted shellfish, introduced on August 7, 1958; to the Committee on Finance. No action.

**INSECTICIDES STUDY OF EFFECT UPON FISH AND WILDLIFE:** S. 2447, a bill to authorize and direct the Secretary of the Interior to undertake continuing studies of effects of insecticides, herbicides, and fungicides upon fish and wildlife for the purpose of preventing losses of those invaluable natural resources following application of these materials, and to provide basic data on the various chemical controls so that forests, crops, wetlands, rangelands, and other lands can be sprayed with minimum losses to fish and wildlife; was referred to the House Merchant Marine and Fisheries Committee on June 2, 1958. Reported by the Committee to the House on July 16, 1958 (H. Rept. 2181). Passed the House as amended on July 21, 1958. Senate agreed to House amendments July 23, 1958, and the bill was cleared for Presidential action. The President signed the bill on August 1, 1958 (P. L. 85-582).

The sum of \$280,000 is authorized to be appropriated to carry out the objectives of the Act.

H. Rept. 2181, Authorizing Research on Insecticides, Herbicides, Fungicides, and Other Pesticides by the Secretary of the Interior (July 16, 1958, 85th Congress, 2nd Session, to accompany S. 2447), 5 pp., printed. This report from the Committee on Merchant Marine and Fisheries explains that the purpose of the bill is to express the intent of Congress that the Secretary of the Interior increase his efforts to determine the effects upon fish and wildlife of the many lethal forms of insecticides, pesticides, and fungicides presently being developed in aid of agriculture. Statements on the bill from the Agriculture and Interior Departments are also presented.

**LOAN FUND FOR FISHERIES:** House Committee on Merchant Marine and Fisheries on August 14 reported S. 3295, an act to amend the Fish and Wildlife Act of 1956 in order to increase the authorization for the fisheries loan fund established under such Act from \$10 million to \$20 million; without amendment (H. Rept. No. 2629). S. 3295 was passed by the House on August 22 and was sent to the President for signature August 25, 1958. It was signed by the President on September 2, 1958 (P. L. 85-888).

H. Rept. No. 2629, Amending the Fish and Wildlife Act of 1956 to Increase Authorization for Fisheries Loan Fund (August 14, 1958, 85th Congress, 2nd Session, to accompany S. 3295), 2 pp., printed. The House Committee on Merchant Marine and Fisheries in this report explains the purpose of the bill and points out the changes in existing law.

H. R. 13528 (MacDonald), a bill to supplement the Fish and Wildlife Act of 1956, and for other purposes; was introduced on July 24 in the House; similar to S. 3295.

**LOBSTER INTERSTATE TRANSPORTATION:** S. 237, a bill to regulate the interstate transportation of lobsters, and to define the term "lobster" for the purpose of the Federal Food, Drug, and Cosmetic Act; reported favorably with amendment by the House Committee on Interstate and Foreign Commerce August 15, 1958 (H. Rept. No. 2652).

H. Rept. No. 2652, Regulating the Interstate Transportation of Lobsters (August 15, 1958, 85th Congress, 2nd Session, to accompany H. R. 2445), 10 pp., printed. The House Interstate and Foreign Commerce Committee reported favorably on the bill and its report explains the purpose of the bill, and presents data and comments submitted by Federal Government agencies.

Senate Committee on Interstate and Foreign Commerce reported S. 237 to the Senate on July 30, 1958 (S. Rept. No. 2062).

S. Rept. No. 2062, Interstate Shipment of Lobsters (July 30, 1958, 85th Congress, 2nd Session, to accompany S. 237), 14 pp., printed. The Senate Committee on Interstate and Foreign Commerce reported favorably on the bill and its report explains the purpose of the bill and presents comments from Federal Government agencies.

Failed to pass after it was passed over by the Senate on August 23.

**MARINE MAMMAL PROTECTION ON THE HIGH SEAS:** H. R. 13444 (Saylor) introduced in the House on July 17, 1958, a bill to revise the Alaska game law and provide for the protection of marine mammals on and off the coast of Alaska; to the Committee on Interior and Insular Affairs. Similar to S. 4115 introduced on July 9, 1958. No action.

**MARKETING FACILITIES IMPROVEMENT ACT:** H. Res. 485 (a resolution to limit debate and bring H. R. 4504 before the Whole House), reported to the House by its Committee on Rules on February 25, 1958. H. Res. 485 failed to pass July 24, 1958. H. R. 4504 (to encourage the improvement of marketing facilities for handling perishable agricultural commodities) failed to pass.

**MIGRATORY BIRD HUNTING STAMP ACT:** S. 2617, a bill to amend the Migratory Bird Stamp Act of March 16, 1934, as amended. Reported (H. Rept. No. 2182) by the House Committee on Merchant Marine and Fisheries on July 16, 1958, and referred to the Committee of the Whole House. This bill was passed by the Senate in June 1958. Passed by the House on July 21, with amendments. Provides for an increase from \$2 to \$3 in the cost



of a duck stamp and restricts the use of receipts from the sale of duck stamps to purchase or lease of wetlands, potholes, etc. Areas to be purchased would include marsh and fresh-water areas along the coasts which would benefit fish and shellfish by protecting important spawning and nursery areas that may be lost through various types of development. This bill was cleared for the President on July 23, 1958, and was signed by the President August 1, 1958 (P. L. 85-585).

H. Rept. 2182, Migratory Bird Hunting Stamps (July 16, 1958, 85th Congress, 2nd Session, to accompany S. 2617), 8 pp., printed. House Merchant Marine and Fisheries Committee favorable report which explains the purpose of the bill, presents statements of Federal agencies, and points out changes in existing law.

**OUTDOOR RECREATIONAL RESOURCES REVIEW COMMISSION:** S. 846, a bill to create a Commission to study the outdoor recreation resources of the public lands and other land and water areas of the United States, and for other purposes. The bill was signed by the President on July 9, 1958 (P. L. 85-470). The Commission is empowered to appoint an Advisory Committee which will include one member from the commercial fishing industry. The Commission is to inventory national recreational resources, project expected recreational usage into the years 1976 and 2000, and recommend means of meeting anticipated needs, reporting finally by September 1, 1961. (Also see under Fish and Wildlife Service Supplemental Appropriations.)

**POLLUTED SHELLFISH IMPORTS PROHIBITED:** S. 4245, a bill to prohibit the importation into the United States of polluted shellfish, introduced in Senate August 7, 1958. No action.

**POWER PROJECTS FISHERIES RESOURCE DEVELOPMENT:** H. R. 13138, a bill to amend the Act of March 10, 1934, to provide for a more effective intergration of a fish and wildlife conservation program with Federal water-resource developments and for other purposes. This bill which replaces 12 or more bills previously introduced was reported (H. Rept. No. 2183) by the House Committee on Merchant Marine and Fisheries on July 16, 1958, and referred to the Committee of the Whole House. The bill passed the House on July 21, 1958, with amendments. This bill (Coordination Act Amendment) is closely related to several other bills which have received some attention in both Houses during the first and second sessions of the 85th Congress.

H. R. 13138 was reported in the Senate by the Interstate and Foreign Commerce Committee on July 28 (S. Rept. 1981). Passed Senate July 31, 1958, and cleared for Presidential action. Signed by the President August 12, 1958 (P. L. 85-624), known as the Fish and Wildlife Coordination Act.

H. Rept. 2183, to Amend the Coordination Act (July 16, 1958, 85th Congress, 2nd Session, to accompany H. R. 13138), 14 pp., printed. In this report the Committee on Merchant Marine and Fisheries indicates the changes which would be made in existing law and presents statements by Federal agencies.

S. 3185 was reported (S. Rept. 2040) by the Senate Committee on Interstate and Foreign Commerce on July 29, 1958. S. Rept. No. 2040, Conservation of Migratory Fish and Game (July 29, 1958, 85th Congress, 2nd Session, to accompany S. 3185), 11 pp., printed. The purpose of the bill is explained, proponents arguments for and arguments against the bill are presented, statements by several Federal agencies and changes in existing law are also included in this report from the Senate Committee on Interstate and Foreign Commerce.

S. 3185 (Neuberger), a bill to promote the conservation of migratory fish and game by requiring certain approval by the Secretary of the Interior of licenses issued under the Federal Power Act was passed over by the Senate August 23. S. 3185 failed to pass.

**SALMON IMPORT RESTRICTIONS:** H. R. 10244, a bill to facilitate the application and operation of the Fish and Wildlife Act of 1956, and for other purposes; reported favorably to the House by the Merchant Marine and Fisheries Committee on July 14, 1958 (H. Rept. No. 2154). This bill would make it unlawful to import, for market and distribution within the United States or its possessions, salmon in any form taken on the high seas of the North Pacific Ocean and adjacent seas, by nets or other means, or at times, places and under conditions or methods of fishing which would be unlawful if practiced or performed by citizens of the United States or of the States of Washington, Oregon, or California.

H. Rept. No. 2154, Facilitating Application and Operation of Fish and Wildlife Act of 1956 (July 14, 1958, 85th Congress, 2nd Session, to accompany H. R. 10244), 3 pp., printed. In its favorable report the Committee on Merchant Marine and Fisheries shows how the Fish and Wildlife Act of 1956 would be amended and presents a report by the U. S. Tariff Commission on the bill.

H. R. 10244 was formally withdrawn in July by its author in a letter to the Chairman of the House Merchant Marine and Fisheries Committee. "It is our conclusion, Congressman Pelly said, "that salmon conservation would not suffer by a delay until early next year." The move came after conference with Senate supporters.

**SEAWEED DUTY EXEMPTION:** H. R. 13010 (Nicholson) introduced in the House on June 18, 1958, a bill to amend the Tariff Act of 1930 to place ground, powdered, or granulated seaweed on the free list. The bill would amend paragraph 1722 of the Tariff Act (19 U. S. C. sec. 1201) by adding after "not especially provided for" a semicolon and the words "but including ground, powdered, or granulated seaweed, by whatever named called." No action.

**SMALL BOAT REGULATION:** H. R. 11078, a bill to promote boating safety on the navigable waters of the United States; to provide coordination and cooperation with the States in the interest of uniformity of boating laws, and for other purposes. The bill passed the House under suspension of the rules (H. Res. 626) on July 18, 1958.

H. Rept. No. 2039, Small Boat Safety (June 26, 1958, 85th Congress, 2nd Session, to accompany H. R. 11078), 35 pp., printed. This report from the Committee on Merchant Marine and Fisheries gives the Committee's amendments, purpose of the bill, background of the legislation, investigations of the Committee, legislative action, a section-by-section analysis of the bill, conclusions of the Committee, estimated annual cost for the work required by the bill, changes in existing law, and statements by several Federal agencies.

H. R. 11078 was reported in the Senate August 12, 1958, by the Senate Committee on Interstate and Foreign Commerce (S. Rept. 2340). Passed the Senate, amended, August 18, 1958. Senate asked for a conference August 18, 1958. House agreed to Senate amendments August 20, 1958, and bill was cleared for Presidential action. The President signed it September 2, 1958 (P. L. 85-911). Provides for the numbering of all undocumented vessels powered with more than 10 horsepower. Under it all undocumented vessels propelled by machinery of more than 10 horsepower using the navigable waters of the United States must be numbered, by the States in those States which adopt the over-all numbering system, and by the Federal Government otherwise. While the Federal numbering system under Federal law applies only to undocumented vessels with more than 10 horsepower, there is nothing in the bill to prevent the States from numbering all undocumented vessels including those of 10 horsepower and less. While the Federal authorities will not number undocumented vessels of 10 horsepower or less, the Coast Guard will still enforce the provisions of the Motor Boat Act of 1940, which have to do with running lights, fire prevention and lifesaving equipment, negligent and reckless operation, etc., with regard to all mechanically-propelled boats regardless of how small or of how little power.

Under the bill the Secretary of the Treasury, probably through the Coast Guard, will establish an over-all numbering system which will apply to all vessels which the Federal Government will number and which may be adopted by each of the several States so desiring, for vessels propelled by machinery of more than 10 horsepower.

Any State has the power to enforce its laws on its own intrastate waters. The adoption of the over-all numbering system will qualify a State to enforce its laws on the navigable waters of the United States within such a State. It must, of course, thereafter number undocumented vessels of over 10 horsepower in accordance with the over-all numbering system.

The bill includes the provision for the collection of statistics with regard to accidents and their compilation in the office of the Secretary for whom the Coast Guard will probably act.

Under the bill there will be available to the Coast Guard the right to use the simplified civil penalty procedure ordinarily comparable to State procedures in connection with very minor offenses including violation of the laws against reckless and negligent operation of small boats of all sizes provided for in the Motor Boat Act of 1940. In addition, and in other respects, civil penalties under H. R. 11078 are changed sufficiently to make them

more effective. Heretofore, the penalty of \$10 for failure to number a vessel required to be numbered was not always sufficient to cause a person to wish to avoid the penalty.

H. R. 11078 primarily is an enabling act which will permit the several States to have concurrent jurisdiction with the Federal Government over the navigable waters within their respective boundaries and to enforce their respective laws on all the waters within such boundaries whether they be intrastate waters or navigable waters of the United States. The States can assume the responsibility for numbering undocumented vessels propelled by machinery and for the passage and enforcement of laws regarding small boats.

**SMALL BUSINESS ADMINISTRATION PERMANENT STATUS:** H. R. 7963, a bill to amend the Small Business Act of 1953 (title II of Public Law 163, 83rd Congress), as amended. The House on July 10, 1958, adopted the report of the Committee on Conference by a voice vote. The bill as finally approved by the House provides for an interest rate of not more than 5½ percent (the bill as passed by the Senate set a limit of 6 percent). The Senate recommendation of an increase from \$250,000 to \$350,000 for a single loan was accepted by the House. The Senate on July 10 agreed to conference report, and the bill was cleared for Presidential action. The bill was signed by the President July 18, 1958 (P. L. 85-536).

H. Rept. No. 2135, Small Business Act (July 9, 1958, 85th Congress, 2nd Session, to accompany H. R. 7963), 6 pp., printed. Contains the recommendations of the Committee of Conference.

Provides that the Small Business Administration, which was set up in 1953 as a temporary agency, now becomes a permanent, independent Federal agency. The ceiling on the individual loans which the Small Business Administration may grant has been raised from \$250,000 to \$350,000. Furthermore, the interest rate has been reduced from 6 percent to 5½ percent.

**SMALL BUSINESS INVESTMENT CORPORATION:** S. 3651, a bill to establish a Small Business Investment Corporation to furnish needed equity capital to small business concerns in the United States; and for other purposes, was passed by the House July 23, 1958, with amendments.

Senate on July 29, 1958, disagreed to amendments by House and appointed Conference Committee members. House agreed to a conference on July 30, 1958. Conference report filed August 6, 1958 (H. Rept. 2492). House and Senate agreed to conference report August 7, 1958, and the bill was cleared for Presidential action.

H. Rept. No. 2492, Small Business Investment Bill of 1958 (August 6, 1958, 85th Congress, 2nd Session, to accompany S. 3651), 7 pp., printed. Recommendations of the Committee of Conference contained in this report.

S. 3651 was signed by the President August 21, 1958 (P. L. 85-699).

Sets up a fund of \$250 million to be added to existing funds of the Small Business Administra-

tion. Equity and long-term capital loans are available to small business through privately-owned investment companies. The Small Business Investment Corporation would furnish up to 50 percent of the capital for the investment companies, who in turn would issue debenture-type securities for small businesses needing additional capital. Loans could be made for 20-year terms and be extended for another ten years under some conditions. It has been provided that these funds will not go directly to individual business but to investment concerns that will in turn allocate the long-term capital to small companies. Investment companies must be formed by at least 10 persons and have a minimum capital of \$300,000, one half of which may be secured from the Small Business Administration.

**SMALL BUSINESS TAX RELIEF:** H. R. 13382 (Mills) and H. R. 13383 (Reed) introduced in House on July 14, 1958, bills to amend the Internal Revenue Code of 1954 to provide tax revision for small business; to the Committee on Ways and Means. H. R. 13382 is a Committee bill and replaces numerous other bills introduced in both Sessions of the 85th Congress.

H. R. 13382 was reported to the House by the Ways and Means Committee July 16, 1958 (H. Rept. 2198). Rules suspended and passed the House July 21, 1958.

H. R. 13382 was reported to the Senate with amendments by its Finance Committee August 6. The language of this bill was included in H. R. 8381, and the latter bill was passed by the Senate on August 12, 1958, with an amendment that added a new title (Small Business Tax Revision Act of 1958) to the bill. The amendment provides the proposals of tax relief for small business that were included in H. R. 13382. The Senate requested a conference with the House and appointed conferees. The bill was sent to conference, and the report of the Conference Committee was adopted by Senate and House August 15, and the bill cleared for the President. The President signed it September 2, 1958 (P. L. 85-866).

H. Rept. No. 2198, Small Business Tax Revision Act of 1958 (July 16, 1958, 85th Congress, 2nd Session, to accompany H. R. 13382), 50 pp., printed. This report from the Committee on Ways and Means summarizes the provisions of the bill, discusses its purpose, explains it section by section, presents the changes in existing law, and gives supplemental views of two members of the Committee.

Provides for (1) faster tax write-offs on new equipment in the first year after its purchase; (2) extension from 2 to 3 years of the time for which a loss may be applied against previous income to gain a retroactive tax refund; (3) ten years instead of 15 months in which to pay estate taxes on a business held by a few persons; (4) an increase from \$60,000 to \$100,000 on the amount of earnings that may be retained instead of being distributed without high tax charges.

**STEELHEAD TROUT INTERSTATE TRANSPORTATION REGULATION:** S. 4180 (Magnuson) introduced in the Senate on July 23, 1958, a bill to regulate the interstate transportation of steelhead

trout; to the Committee on Interstate and Foreign Commerce. No. action.

**TRADE AGREEMENT POLICY COMMISSION:** S. 4272 (Flanders, for himself and 8 other Senators), a bill to establish a Commission on International Trade Agreement Policy, introduced in the Senate on August 12, 1958. No action.

**TRADE AGREEMENTS ACT EXTENSION:** H. R. 12591, a bill to extend the authority of the President to enter into trade agreements under section 350 of the Tariff Act of 1930, as amended, and for other purposes. Reported by the Senate Committee on Finance with amendments on July 15, 1958. As amended by the Senate Committee the authority of the President to enter into trade agreements would be extended for a three-year period, instead of five years as approved by the House. Authority to reduce tariffs would be limited to 15 percent in stages of 5 percent. The House approved a reduction of 25 percent in stages of 10 percent in any one year. The Senate also recommended that a Presidential decision to over-ride a favorable decision of the Tariff Commission be subject to a majority vote of Congress; also, a tie vote by the Commission would be considered affirmative; and that conflicting recommendations by the Commission as to a remedy, the recommendation which in the opinion of the President provided the greatest relief to industry would prevail. The Senate Committee's recommendations also included the establishment of a 9-member bipartisan Commission to be composed of 3 members appointed by the President (none from the Executive Branch) and three each from the House and Senate Committees on Ways and Means. The Commission would investigate and report on the international trade agreement policy of the United States and recommend improvements in policies, measures, and practices. An interim report would be filed on or before June 30, 1959, and a final report on or before June 30, 1960.

The Senate on July 16, 1958, adopted the amendments made by House Committee on Ways and Means to the bill and as passed by the House and proceeded to debate the bill on the Senate floor for further amendments. The bill passed the Senate July 22, 1958. Senate asked for a conference July 22, 1958. House agreed to a conference July 23, 1958. Conference report filed August 6, 1958 (H. Rept. 2502). House agreed to conference report August 7, 1958. Senate agreed to conference report August 11, 1958, and the bill was cleared for Presidential action.

H. R. 12591, was signed by the President on August 20, 1958 (P. L. 85-686).

H. R. 12591 renews the authority of the President to enter into trade agreements for 4 years--from the close of June 30, 1958, through June 30, 1962. During the 4-year period the President would be granted new authority to reduce individual tariff rates to the lowest rate obtainable by any one of three alternative methods, as follows:

Reducing the July 1, 1958, rate by not more than 20 percent. The President would be authorized to make reductions gradually in not more than four annual stages. Ten percent of the total reduction would generally be the maximum reduction that could be made effective in any one year.

Reducing the July 1, 1958, rate by not more than 2 percentage points. Such reductions would also take effect in not more than four stages, and no reduction of more than 1 percentage point would generally be made effective in any one year. This alternative authority, which has not been provided for in previous trade agreements legislation, would be significant in cases where 2 percentage points would permit a larger reduction than the maximum reduction obtainable under the first alternative method. Thus, if the July 1, 1958, rate were 5 percent, the second method would permit a reduction to 3 percent, whereas the first method would permit a reduction to 4 percent.

Reducing an existing rate which is higher than 50 percent ad valorem to not less than 50 percent ad valorem. Similar authority was granted in previous trade agreements legislation. Reductions under this method would also have to be made gradually by stages. One-third of the total reduction would be the maximum reduction that would be made effective in any one year. This alternative method would be significant in cases where rates exceed 62 percent, where it would permit a greater reduction than that obtainable under the first alternative method.

With respect to the above three alternative methods, in no case may there be more than 4 stages, nor may separate stages be less than a year apart, nor may the last stage be later than 3 years after the first stage. There is no loss (lapse) of reduction authority if not put into effect before July 1, 1962, the expiration of the President's authority to enter into new agreements, but a later cutoff date (June 30, 1966) is provided. Under this provision the President can enter into a trade agreement, using the full authorized reduction authority and provide in the agreement that such reduction shall be put into effect either during the 4-year period ending June 30, 1962, or thereafter. But no part of a reduction may be put into effect for the first time after June 30, 1966--i.e., 4 years from the expiration of the new extended period of authority to enter into trade agreements.

As in previous trade agreements legislation, proposed changes in United States tariff rates would be subject to the peril-point provisions. These provisions direct the President, before entering into negotiations, to furnish the Tariff Commission with a list of articles imported into the United States, the rates or other customs treatment of which may be considered for possible modification. The Commission, in turn, is directed to make an investigation and report to the President within 120 days its findings as to (1) the peril-point or rate below which U. S. duties may not be reduced without resulting in serious injury to domestic industry; and (2) the minimum increases in U. S. duties or additional import restrictions required to avoid serious injury. H. R. 12591 provides for the continuation of these provisions, but extends the period of time that the Commission has to make its investigations and reports to the President from 120 days to 6 months to permit the Commission to make more extensive investigations.

H. R. 12591 also amends the peril-point provisions by directing the Tariff Commission, as previous legislation did not, to start an escape-clause

investigation promptly whenever it finds, during peril-point investigations, that an increase in the existing duty or additional import restrictions is required to avoid serious injury. This applies to any article on the list on which a tariff concession has been previously granted. The purpose of this amendment is to provide for more prompt and effective consideration of serious injury cases and determination of whether escape-clause action is needed.

The bill also contains a new provision which lists certain price information and import data that the Commission, to the extent practicable and without excluding other factors, is to develop during peril-point investigations.

The escape-clause provisions put into effect by previous legislation are also continued, but with the addition of several new amendments.

Under previous legislation, the Tariff Commission was required, upon application of an interested party, to make an investigation to determine whether imports of a particular commodity subject to a trade agreements concession were causing or threatening serious injury to a domestic industry. If the Commission found evidence of injury, it was required to submit a report to the President within 9 months with a recommendation for remedial action. The President made the final determination regarding the acceptance of a Tariff Commission recommendation that a duty be raised or a quota be imposed on imports.

These procedures are continued under H. R. 12591 except that if the Congress decides that the action recommended by the Commission and disapproved by the President should be put into effect such action must be put into effect in the event that the Congress--within 60 days of the President's disapproval--adopts a concurrent resolution by a two-thirds vote of each House approving the Commission's recommendation. Under the new procedure, any such resolution would be given privileged status in order to expedite Congressional consideration.

Another amendment reduces the time that the Tariff Commission has to make escape-clause investigations and reports thereon from 9 months to 6 months.

Under another new provision, the powers of the Tariff Commission to obtain information by subpoena, and related powers, are extended and expanded. They would be applicable to Commission investigations under the trade agreements and other legislation.

H. R. 12591 further provides the President with authority in escape-clause cases to impose a duty as high as 50 percent ad valorem on a duty-free item which has been bound in a trade agreement. The President's authority to provide relief under previous legislation was limited because the law forbade transfer by the President of articles from the free list to the dutiable list. The new provision would expand relief measures available to domestic industry being seriously injured by duty-free imports.

Finally, it is provided that organizations or groups of employees are eligible as interested



parties to file an application for an escape-clause investigation. This provision was added in order to make it clear that such bodies could make application even though management was not a party to the application.

The national security amendment of the previous legislation is retained in H. R. 12591 but in modified form. Under the terms of the amendment, the President may not decrease duties on imports, but may restrict imports, that are found to threaten the national security. More detailed standards and criteria are provided for the guidance of the President and the Director of the Office of Defense and Civilian Mobilization (ODCM). A provision was inserted requiring that the ODCM issue regulations for the conduct of investigations under this section. In addition, procedural changes were made toward eliminating multiple investigations possible under the previous legislations and requiring that a report be made and published on the disposition of each national security case.

H. R. 12591 authorizes the President to raise duties as much as 50 percent over the rates which existed on July 1, 1934. In the case of specific duties the President, where necessary, would be able to convert such duties to their July 1, 1934, ad valorem equivalent, using 1934 value, and increase such equivalents to 50 percent. Previous legislation provided the President with authority to increase rates as much as 50 percent over the rates existing on January 1, 1945. Since on many items the 1934 rates were substantially higher than the 1945 rates, this change in the base date would increase the extent to which duties on such items could be raised where necessary to avert serious injury to domestic industry.

H. R. 12591 continues the requirement that the President submit to the Congress an annual report on the operations of the trade agreements program, but in addition, directs him to include in such reports a statement on results of action taken to obtain the removal of foreign restrictions, including discriminatory restrictions, against United States exports; and the measures available to seek the removal of remaining restrictions.

H. R. 12591 declares it to be the sense of the Congress that during the course of negotiating a trade agreement, the President should seek information and advice from representatives of American industry, agriculture, and labor with respect to such agreement.

**TUNA IMPORT REGULATION:** H. R. 13411 (Wilson of Calif.), introduced in the House on July 16, 1958, a bill to regulate the importation of tuna; referred to the Committee on Ways and Means.

Failed to pass.

**TUNA INDUSTRY STABILIZATION ACT:** H. R. 13410 (Wilson) introduced in the House on July 15, 1958, and H. R. 13425 (Utt) on July 16, 1958, bills to stabilize the tuna fishing industry; both referred to the Committee on Merchant Marine and Fisheries.

Failed to pass.

**UNEMPLOYMENT RELIEF IN DEPRESSED AREAS:** S. 3683, a bill to establish an effective program to alleviate conditions of substantial and persistent unemployment and underemployment in certain economically depressed areas; passed the House, amended, August 15, 1958. It was cleared for Presidential action August 25. Pocket vetoed by President.

H. Rept. 2099, Area Redevelopment Act (July 1, 1958, 85th Congress, 2nd Session, to accompany S. 3683), 41 pp., printed. Report from the House Banking and Currency Committee recommends passage of the bill with amendments. It pointed out that many industrial and rural areas throughout the United States have suffered from a high level of unemployment and underemployment, year after year, in good times and bad. The bill "is designed to help these areas lift themselves out of this situation, to transform themselves into productive communities. . . ." The report discusses the background of the bill, the need, the major provisions, differences between Senate and House versions; and presents a section by section analysis and changes in existing law.



Editorial Assistant--Ruth V. Keefe

Illustrator--Gustaf T. Sundstrom

Compositors--Jean Zalevsky, Alma Greene, Helen Joswick, and Vera Eggleston

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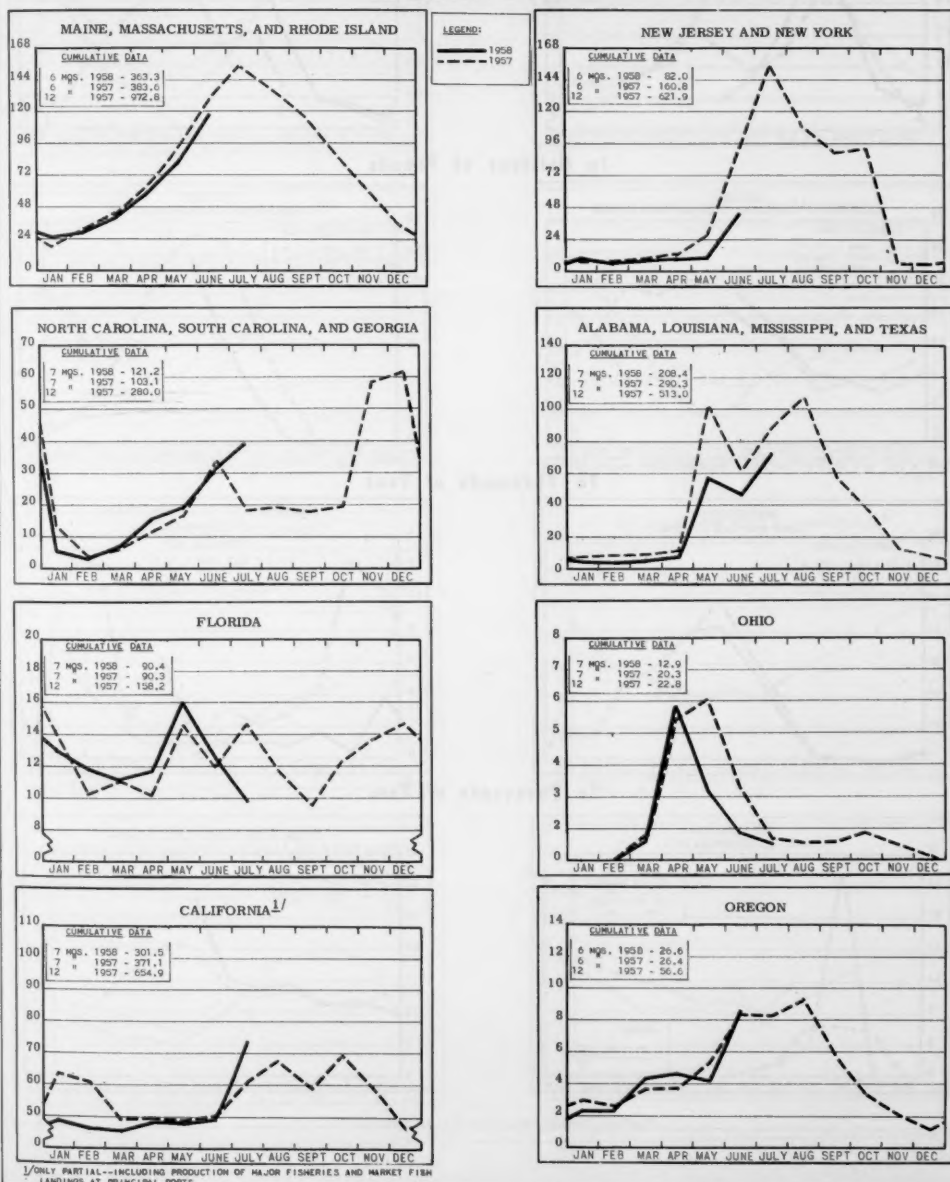
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# FISHERY INDICATORS

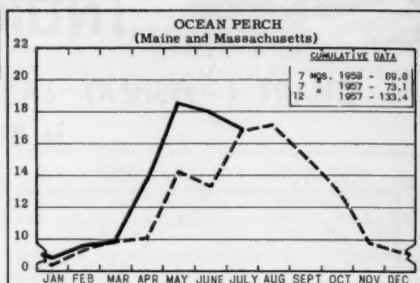
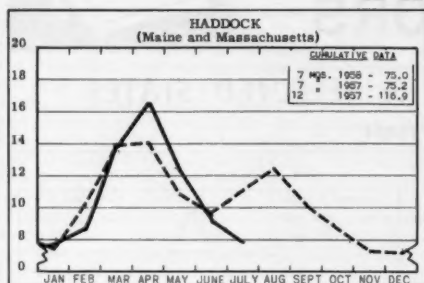
## CHART 1 - FISHERY LANDINGS for SELECTED STATES

In Millions of Pounds

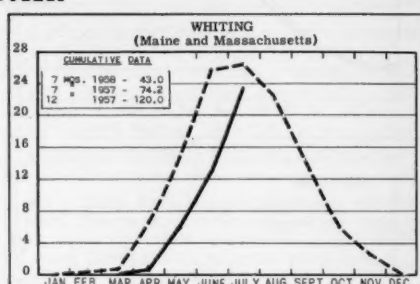
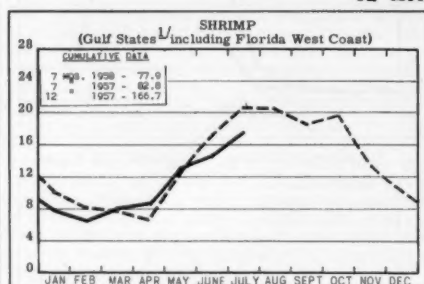


## CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

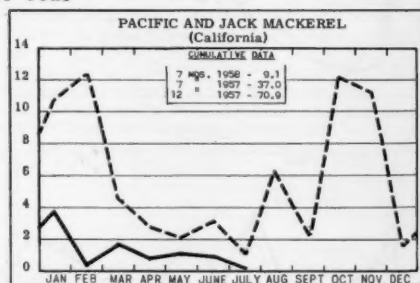
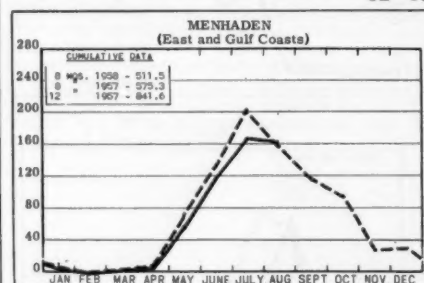


In Millions of Pounds

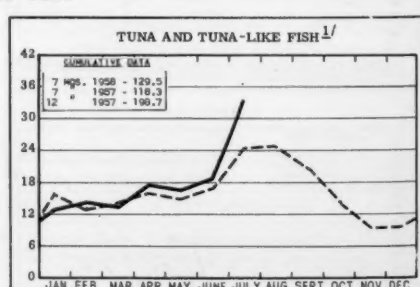
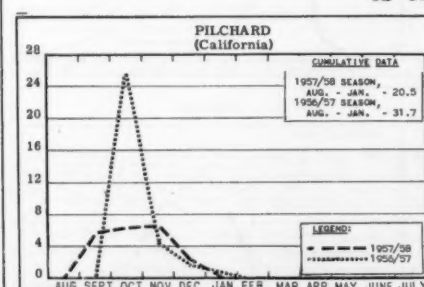


<sup>1/</sup>LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons

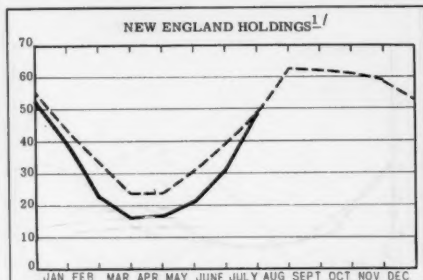
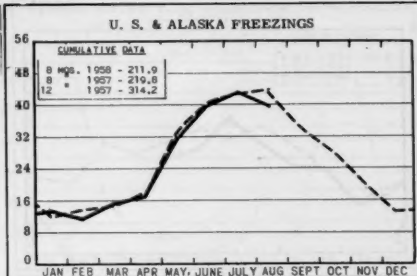
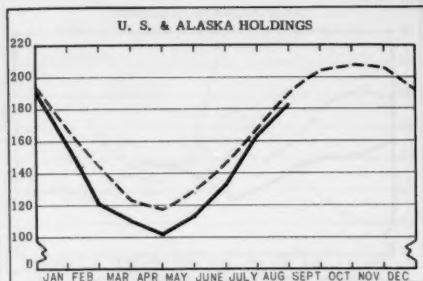


In Thousands of Tons

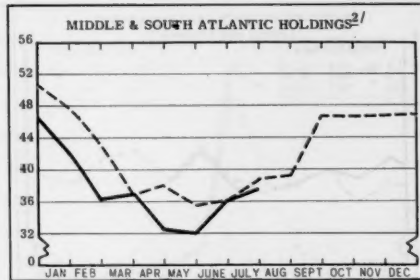


# **CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS \***

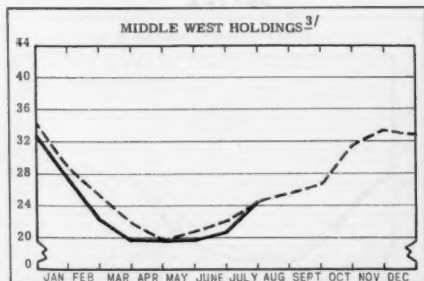
In Millions of Pounds



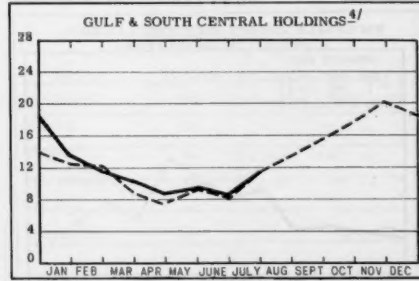
<sup>1/</sup>MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT.



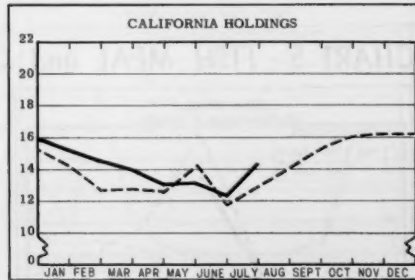
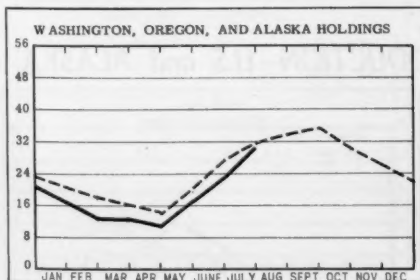
<sup>2/</sup>ALL EAST COAST STATES FROM N.Y. SOUTH.



<sup>3/</sup>OHIO, IND., ILL., WICH., WIS., MINN., IOWA, MO., N. DAK., NEBR., & KANS.



<sup>4/</sup>ALA., MISS., LA., TEX., ARK., KY., & TENN.

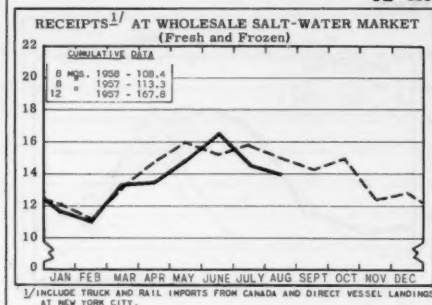


\* Excludes salted, cured, and smoked products.

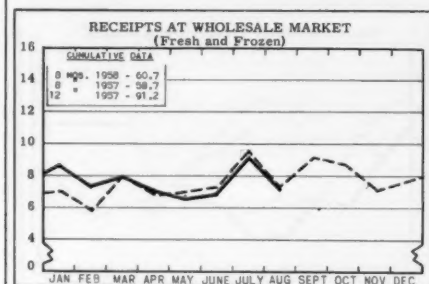
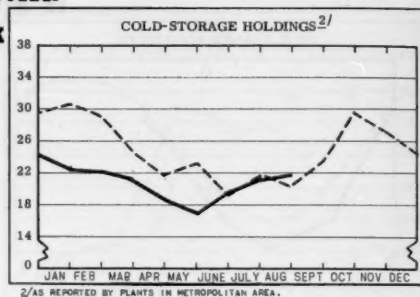


# CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

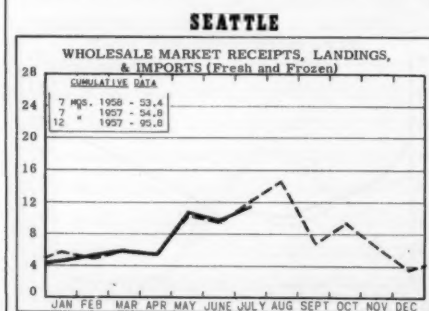
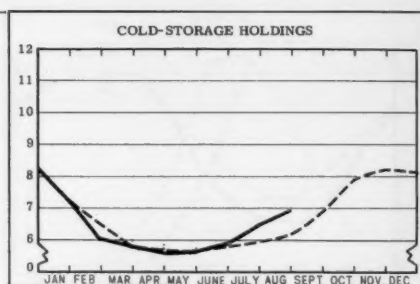
In Millions of Pounds



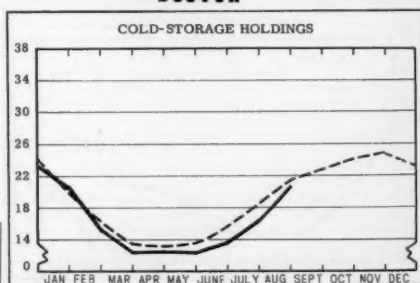
**NEW YORK CITY**



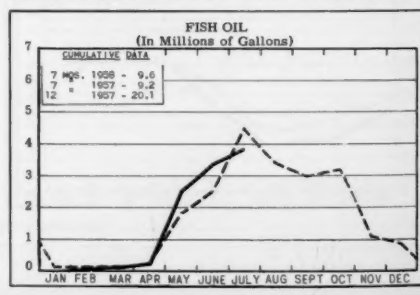
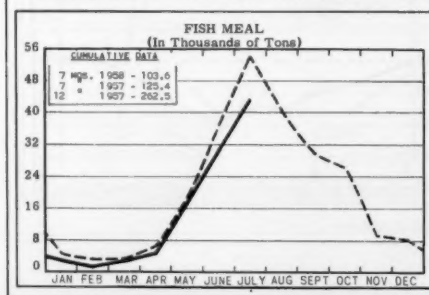
**CHICAGO**



**BOSTON**

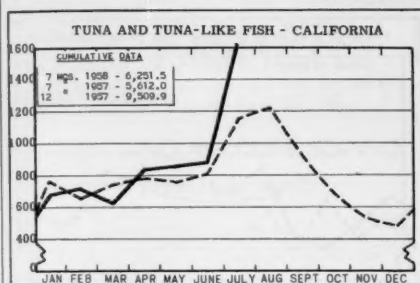


## CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA

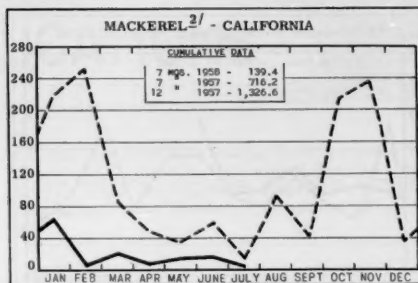


# CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

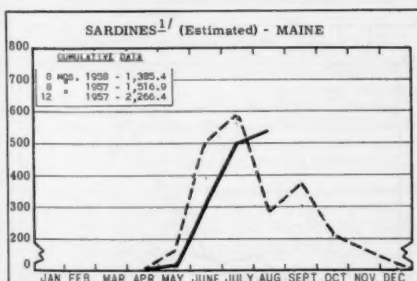
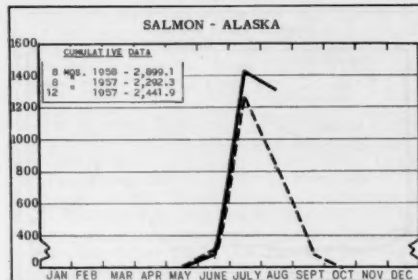
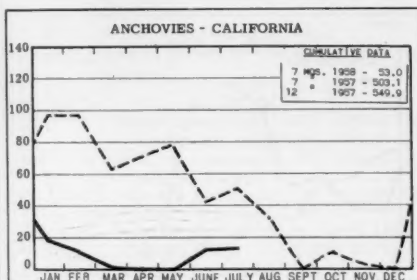
In Thousands of Standard Cases



LEGEND:  
— 1958  
--- 1957  
..... 1957

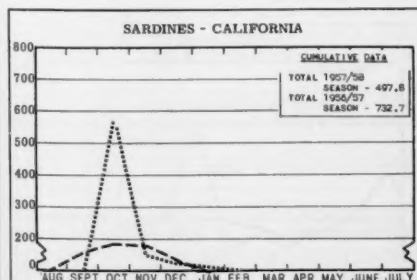


<sup>2/</sup>INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.

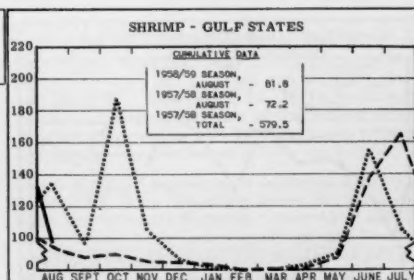


## STANDARD CASES

Variety	No. Cans	Designation	Net Wgt.
SARDINES.....	100	$\frac{1}{2}$ drawn	3 $\frac{1}{2}$ oz.
SHRIMP.....	48	--	5 oz.
TUNA.....	48	# $\frac{1}{2}$ tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	$\frac{1}{2}$ -lb.	8 oz.

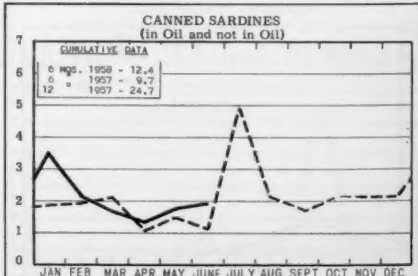
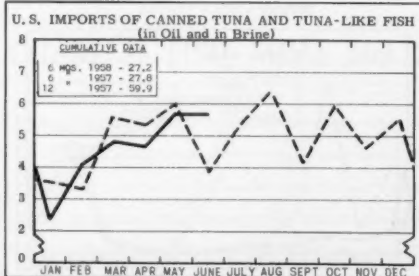
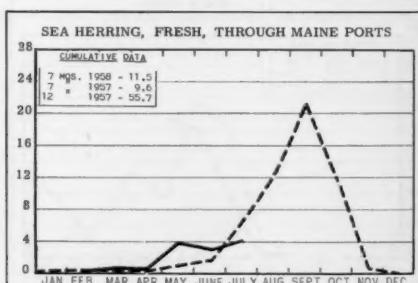
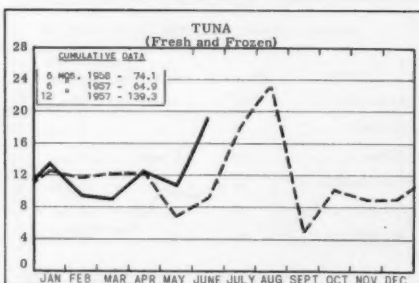
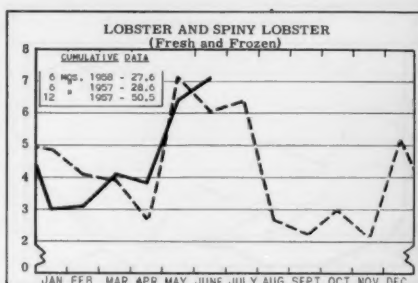
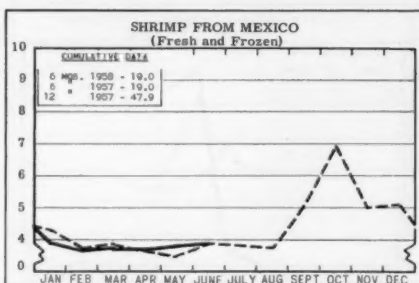
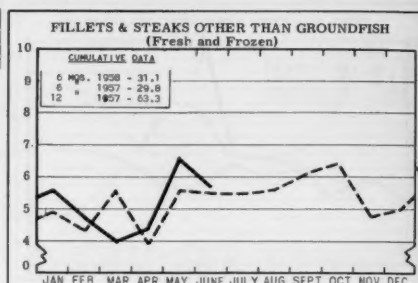
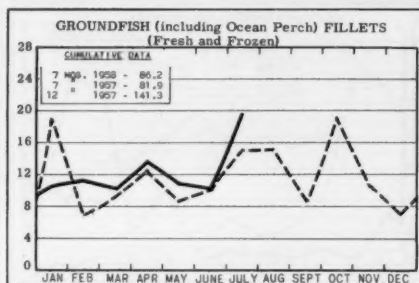


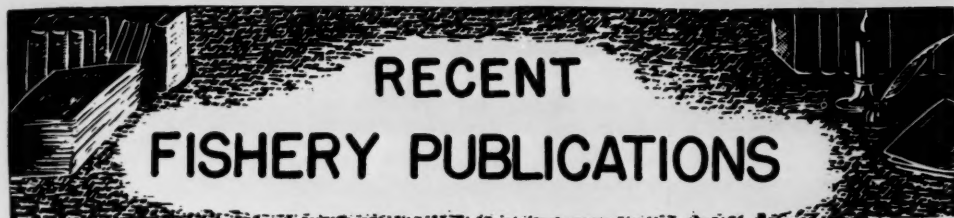
Legend:  
— 1958/59  
--- 1957/58  
..... 1956/57



# CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds





# RECENT FISHERY PUBLICATIONS

## FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.  
FL - FISHERY LEAFLETS.  
SSR - FISH, SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).  
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

- | Number            | Title   |
|-------------------|---|
| CFS-1779          | - Maine Landings, 1957 Annual Summary by County and Gear, 10 pp.  |
| CFS-1793          | - Shrimp Landings, 1957 Annual Summary, 16 pp.  |
| CFS-1817          | - Florida Landings, 1957 Annual Summary (revised), 10 pp.   |
| CFS-1820          | - New Jersey Landings, April 1958, 3 pp.  |
| CFS-1823          | - Fish Meal and Oil, April 1958, 2 pp.  |
| CFS-1826          | - Shrimp Landings, February 1958, 6 pp.   |
| CFS-1827          | - Florida Landings, April 1958, 7 pp.   |
| CFS-1829          | - North Carolina Landings, May 1958, 3 pp.  |
| CFS-1830          | - Alabama Landings, April 1958, 2 pp.   |
| CFS-1832          | - Texas Landings, March 1958, 3 pp.   |
| CFS-1834          | - New Jersey Landings, May 1958, 3 pp.  |
| FL-452            | - Fishery Motion Pictures, 18 pp., illus., processed, 1958. This leaflet lists the commercial fishery motion pictures produced and distributed by the U. S. Bureau of Commercial Fisheries.                     |
| SSR-Fish. No. 238 | - Marquesas Area Oceanographic and Fishery Data, January-March 1957, by Robert C. Wilson and Murice O. Rinkel, 141 pp., illus., September 1957.   |
| SSR-Fish. No. 248 | - Physical Oceanographic, Biological and Chemical Data--South Atlantic Coast of the United States, M/V Theodore N. Gill, Cruise 5, by William W. Anderson and Jack W. Gehringer, 223 pp., illus., January 1958. |
| Sep. No. 517      | - Chemical and Enzymatic Hydrolysis of Fish Scales.   |
| Sep. No. 518      | - Amino Acid Composition of the Protein and Inorganic Constituents of the Ash of Pollock Fish Scales.   |
| Sep. No. 519      | - Gloucester's Trawl Fishery for Industrial Fish.   |
| Sep. No. 520      | - Inspection and Certification of Fishery Products by U. S. Department of the Interior.   |
| Sep. No. 521      | - Research in Service Laboratories (August 1958): Contains these articles--"Changes   |

in Composition of Sole During Refrigeration;" "Bacterial Content of Processed Shrimp Under Study;" "Fish Stick Quality Improved by Better Packaging;" and "Oxidative Enzymes in Fish Tissue."

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

California Fishery Products and Byproducts Brokers and Importers, 1958, (Partial List), SP List 1, 5 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif., June 1958.)

(Chicago) Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, June 1958, 12 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces; fresh-water fish, shrimp, and frozen fillet wholesale market prices; for the month indicated.

Monthly Summary of Fishery Products in Selected Areas of Virginia, North Carolina, and Maryland, June 1958, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern shore; the Maryland areas of Crisfield, Ocean City, and Cambridge; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

(New York) Brokers and Importers of Fishery Products, New York City, 1958, 7 pp. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y., June 20, 1958.)

(New York) Monthly Summary - Receipts of Fishery Products at the New York City Wholesale Salt-Water Market, May 1958, 15 pp. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.) Receipts in the salt-water section of the Fulton Fish Market by species and by states and provinces for the month indicated.

(Seattle) Monthly Summary - Fishery Products, June 1958, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 South, Seattle 4, Wash.) Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and



Astoria (Ore.) wholesale dealers; also Northwest Pacific halibut landings; for the month indicated.

Production of Fishery Products in Selected Areas of Virginia, Maryland, and North Carolina,

1957 (As Reported to Hampton Fishery Market News Office), by William N. Kelly, 43 pp., processed. (Available free from the Market News Service, 18 So. King St., Hampton, Va.) A summary of commercial landings of fish and shellfish and the production of crab meat and shucked oysters as reported by producers and wholesalers from selected principal fishing localities of Virginia, Maryland, and North Carolina. Included are ex-vessel prices for the principal food finfish and wholesale prices for crab meat and shucked oysters. The statistics contained in this annual summary represent partial commercial fisheries production only and do not represent complete commercial landings or production for a given area, individual state, or the Chesapeake Bay area as a whole. The statistics, however, do give an indication as to the trend in fisheries production for the specific areas designated and do reflect the over-all production trend by species, localities, and by states.

Annual Report of the Gulf Fishery Investigations

(for the Year Ending June 30, 1958), 109 pp., illus., processed. (Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, Galveston, Texas.) Includes a summary of the Gulf fishery investigations for the fiscal year ending June 30, 1958, and a symposium on red tide. Also includes discussions of the following projects: ecology of brown and white shrimp; shrimp bait fishery; Tortugas pink shrimp fishery; shrimp marking; and morphology of shrimp. The section on pelagic fish includes discussions of the age and growth of menhaden; menhaden development; menhaden populations; and zooplankton. The section on red tide includes discussions on nutrition of red tide organisms; compounds toxic to red tide organisms; occurrence of red tide organisms; hydrography related to red tide; large-scale experimental control of red tide; copper ore experiments for red tide control; and toxicity of copper to marine organisms. Special projects cover the effect of insecticides on marine organisms; barnacle attachment rates at Galveston, Texas; toxicity of *Gonyaulax monilata* to fish; histological techniques for *Gymnodinium* sp.; Chlorinity sampling and storage; phosphorus content of marine organisms; and determination of organic compounds in sea water.

Fishery Technological Laboratory Brochures:

Fishery Technological Research and Services for the Pacific Coast Fishing Industry, 5 pp., brochure, printed (Fishery Technological Laboratory, 2725 Montlake Blvd., Seattle 2, Wash.); At Your Service--Technical Research, Demonstrations, Publications, Assistance, 4 pp., brochure, printed (Fishery Technological Laboratory, P. O. Box 128, College Park, Md.); Technological Services, 3 pp., processed (Fishery Products Laboratory, 622 Mission St.,

Ketchikan, Alaska); The Fisheries Technology Laboratory, 8 pp., brochure, processed (Fisheries Technology Laboratory, 289 Frederick St., Pascagoula, Miss.); and Serving Industry Through Research, Technical Assistance, Advisory Services, Demonstrations, Publications, 12 pp., brochure, processed (Fishery Technological Laboratory, 61 Sumner St., East Boston 28, Mass.). Informational brochures on services available to industry from the Fishery Technological Laboratories.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Anadromy in North American Salmonidae, by George A. Rounsefell, Fishery Bulletin 131 (From Fishery Bulletin of the Fish and Wildlife Service, vol. 58), 17 pp., illus., printed, 20 cents, 1958.

Experimental Exploitation of Fish Populations, by

Ralph P. Silliman and James S. Gutsell, with the technical assistance of Clarence E. Dunbar and Saufley B. Friddle, Fishery Bulletin 133 (From Fishery Bulletin of the Fish and Wildlife Service, vol. 58), 40 pp., illus., printed, 20 cents, 1958. The primary objectives of the work, described in this report, were to learn as much as possible about the reaction of fish populations to different rates of exploitation, to discover the relation between equilibrium yield and exploitation rate, and to establish principles of exploitation which would be applicable to commercially-utilized fish populations. An additional objective was to find how many of the known facts regarding population changes would be revealed by the conventional measures of total catch, catch per unit of effort, and mean length of fish in the catch. Four laboratory populations of guppies were grown in small aquariums under controlled light, temperature, and food supply. Two of the populations were selected by lot as controls; the other two were used as experimental populations for application of various fishing pressures. Successive application of fishing rates of 25, 10, 50, and 75 percent per triweekly period produced major changes in the experimental populations not duplicated in the controls. The general effect of exploitation was to produce a decrease in the size of the population, the amount of the decrease varying upward with the exploitation rate, until at the 75-percent rate the test populations were extinguished. Abundance and size composition of the stocks followed classical conception derived on theoretical grounds. Equilibrium yield was found to be related to fishing rate in the manner of a humped curve, with maximal yield at fishing rates between 30 and 40 percent, when the populations were at approximately one-third their asymptotic weight. The yield of fish flesh at the maximum represented about one-fifth the weight of the food consumed. The conventional fishery measures--catch, catch per unit of effort, and average fish length--were calculated and were found to yield a large amount of information about population size and results of changes in rate of exploitation.

## MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

### ALGAE:

An Annotated List of Marine Algae from Eniwetok Atoll, Marshall Islands, by E. Yale Dawson, Contribution No. 87, 41 pp., illus., printed. (Reprinted from *Pacific Science*, January 1957.) Hawaii Marine Laboratory, University of Hawaii, Honolulu 14, Hawaii.

### CALIFORNIA:

California Cooperative Oceanic Fisheries Investigations, Progress Report, 1 July 1956 to 1 January 1958, 57 pp., illus., printed. State Fisheries Laboratory, California Department of Fish and Game, Terminal Island, Calif. This report consists of three parts: a review of the activities of the California Cooperative Oceanic Fisheries Investigations for the period July 1, 1956, to January 1, 1958; a scientific paper, "Studies of the California Current System," by Joseph L. Reid, Jr., Gunnar I. Roden, and John G. Wyllie; and a list of publications arising from the program.

Fish and Game Code Annotated of the State of California (Deering's California Codes), Adopted May 21, 1957, 666 pp., printed. Bancroft-Whitney Co., McAllister & Hyde Streets, San Francisco 1, Calif. Includes all laws affecting commercial and sport fishing.

Statistical Report of Fresh, Canned, Cured, and Manufactured Fishery Products, 1957, Circular No. 32, 18 pp., printed. Department of Fish and Game, Sacramento, Calif., 1958. Presents statistics on the landings of fish, mollusk, and crustacean by California's commercial fishing fleet--statewide and by general regions; general origin of the commercial catch and the volume of shipments of fish received for canning and processing; total case pack for each variety of fish according to container size and type of pack; volume of canned and smoked sport-caught fish; sardine landings and manufactured sardine products; and total annual case pack of anchovy, tuna, bonito, and yellowtail in various sizes of containers, equated to the most common pack size for each variety.

### CANADA:

The Effect of the Prevailing Winds on the Inshore Water Masses of the Hecate Strait Region, B. C., by F. G. Barber, 8 pp., illus., printed. (Reprinted from the *Journal of the Fisheries Research Board of Canada*, vol. 14, no. 6, pp. 945-952, 1957.) Fisheries Research Board of Canada, Pacific Oceanographic Group, Nanaimo, B. C., Canada.

Fisheries Statistics of Canada, 1956 (Quebec), 73 pp., illus., printed in French and English, 50 Canadian cents. Queen's Printer and Controller of Stationery, Ottawa, Canada, 1958. Consists of tables giving the quantity and value of the principal species of fish and shellfish in

Quebec in 1949-56; quantity and value of landings by species and fisheries districts, 1955-56; quantity and value of manufactured fishery products by species and fisheries districts, 1955-56; capital equipment in the primary fisheries operations by fisheries districts, 1955-56; and number of persons engaged in the fisheries by fisheries districts, 1955-56.

Journal of the Fisheries Research Board of Canada, vol. 15, no. 4, July 1958, pp. 495-758, illus., printed. Queen's Printer and Controller of Stationery, Ottawa, Canada. Contains the following articles: "Incidence of the Ascarid *Parrocaecum decipiens* in the Stomachs of Three Species of Seals Along the Southern Canadian Atlantic Mainland," by D. M. Scott and H. D. Fisher; "Round Haddock Landings in Newfoundland: Quantity and Quality Relative to Gutted Haddock," by Wilfred Templeman and A. M. Fleming; "A Preliminary Study of the Feeding Habits of the Japanese Oyster Drill, *Ocenebra japonica*," by Kenneth K. Chew and Ronald Eisler; "The Effect of Various Lighting Conditions on the Efficiency of 'Candling' Cod Fillets for Detection of Parasites," by H. E. Power; "Artificial Drying of Salt Fish by Thermocouple Control," by R. Legendre; "The Composition of the Fatty Acids Liberated from the Phospholipids in the Preparation of Salted Codfish," by A. Cardin, M. A. Bordeleau, and A. Laframboise; "Tolerance of Fish to Toxic Pollution," by T. W. Beak; "Hyperactivity as a Lethal Factor in Fish," by Edgar C. Black; and "The Effect of Temperature on the Cruising Speed of Young Sockeye and Coho Salmon," by J. R. Brett, M. Hollands, and D. F. Alderdice.

Progress Reports of the Atlantic Coast Stations, no. 69, 39 pp., illus., printed in French and English. Queen's Printer and Controller of Stationery, Ottawa, Canada, May 1958. Contains, among others, the following articles: "Comparative Effects of the Insecticides DDT and Malathion on Young Atlantic Salmon," by Miles H. A. Keenleyside; "Control of the Boring Sponge on Oyster Beds," by F. E. Warburton; "Do Lobsters Move Offshore and Onshore in the Fall and Spring?" by D. G. Wilder and R. C. Murray; "Lath-Spacing in Lobster Traps," by W. Templeman; "White Crystals of Sodium Phosphate on Salt Fish," by W. J. Dyer, Doris I. Fraser, and J. R. Dingle; and "First-Year Effects of Mesh Regulations on Northern New Brunswick Dragger Fishery," by W. R. Martin and Y. Jean.

### CRAWFISH:

"The Refrigeration and Storage of Crawfish," by N. Golovkin and I. Parshina, article, *Kholodilnaya Tekhnika*, no. 1, 1958, pp. 26-27, printed in Russian with English summary. *Kholodilnaya Tekhnika*, 1 Astradamskiy tupik 1-a, Moscow A-8, U. S. S. R. Reports on the methods for refrigerating crayfish and on conditions for storage in the frozen state. For prolonged storage during periods of 8-9 months, the authors propose a blast-freezing method and storage of crayfish at temperatures of -20° to -29° C. For storage periods of 1-2 months, temperatures ranging from -6° to -10° C. are recommended.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

## CUBA:

Experiencias con el Empleo de Equipo Oceanografico en el Golfo de Batabano (Results from Experiments with Oceanographic Equipment in the Gulf of Batabano, Cuba), by Pedro Pablo Duarte-Bello, Laboratorio de Biología Marina, Monografía no. 4, 30 pp., illus., printed in Spanish. Universidad Católica de Santo Tomas de Villanueva, Apartado No. 6, Marianao, Havana, Cuba, March 1958.

"Los Recursos Naturales Renovables en el Mar Cubano" (The Renewable Natural Resources in Cuban Marine Waters), by Dr. Mario Sanchez Roig and Federico Gomez de la Maza, article, Mar y Pesca, vol. II, no. 2, April 1958, pp. 23-28, illus., printed in Spanish. Instituto Nacional de la Pesca, Malecon 59, Havana, Cuba. Reports on the economic importance of Cuba's production of fish, mollusks, crustaceans, and fishery byproducts, and discusses the possibilities of increasing fishery production by (1) the use of a system of flexible fishing seasons; (2) an increase of biological and oceanographic studies of Cuba's marine resources; (3) the use of more modern gear, vessels, and fishing methods; (4) repopulation of marine waters with species that have been overfished; (5) international co-operation in measures for conservation of marine fauna; (6) Cuban representation at international conferences on fisheries; (7) control measures to avoid harmful pollution; (8) prevention of illicit fishing methods, especially the use of explosives; (9) extensive publicity to inform the populace of the advantages of eating fish, to increase consumption; and (10) the forthcoming construction of a large and modern fishery terminal at the port of Havana.

## EEL-GRASS:

Control of Eel-Grass in Oyster Culture Areas, by A. R. A. Taylor, General Series Circular No. 23, 3 pp., illus., printed. Fisheries Research Board of Canada, Atlantic Biological Station, St. Andrews, N. B., Canada, February 1954.

## EXPORTS:

United States Exports of Domestic and Foreign Merchandise (Commodity by Country of Destination), Calendar Year 1957, Report No. FT 410, processed, Part I, 257 pp., \$1.25; Part II, 428 pp., \$2. Bureau of the Census, U. S. Department of Commerce, Washington, D. C., April 1958. (For sale by the Superintendent of Documents, Washington 25, D. C.) The statistics in Part I cover exports of domestic and foreign merchandise (including fishery products and byproducts) under group 00 to group 5 from the United States to foreign countries. Part II covers merchandise under group 6 to 9 (some items of interest to the fishery and allied industries are included).

## FISHES:

A Checklist of the Freshwater Fishes of Canada and Alaska, by W. B. Scott, 31 pp., processed, 35 Canadian cents. Royal Ontario Museum, Division of Zoology and Palaeontology, 100 Queens Park, Toronto 5, Ontario, Canada, February 1958.

## FISH FLOUR:

"Fish Visceral Flour Reported Satisfactory as Swine Supplement," article, Feedstuffs, vol. 30, February 22, 1958, 1 p., printed. Feedstuffs, Miller Publishing Co., 118 S. 6th St., Minneapolis 2, Minn.

"The Production of Edible Fish Protein (Fish Flour) from Cod and Haddock," by A. Guttman and F. A. Vandenheuvel, article, Progress Reports of the Atlantic Coast Stations, No. 67, November 1957, pp. 29-31, printed. Fisheries Research Board of Canada, Fisheries Technological Station, Halifax, Nova Scotia.

## FISH MEAL:

"Fish Meal. 4--Condition of Pilchard at Walvis Bay," by G. H. Stander and J. P. Matthews, article, Annual Report of the Fishing Industry Research Institute, 1955-1956, vol. 9, pp. 21-22, printed. Fishing Industry Research Institute, South Africa, Union of South Africa.

"Fish Meal. 7--Preliminary Comparison of Various Cooker-Press Combinations," by G. M. Dreosti and G. H. Stander, article, Annual Report of the Fishing Industry Research Institute, 1955-1956, vol. 9, 1 p., printed. Fishing Industry Research Institute, Cape Town, Union of South Africa.

"Fish Meal. 10--Storage of Fish Meal at Elevated Temperatures," by G. M. Dreosti and R. J. Nachinius, article, Annual Report of the Fishing Industry Research Institute, 1955-1956, vol. 9, p. 27, printed. Fishing Industry Research Institute, Cape Town, Union of South Africa. Describes experiments with canned fish meal stored at temperatures ranging from 32° to 300° F.

"Fish Meal. 11--Spontaneous Heating of Fish Meal," by G. M. Dreosti, A. N. Rowan, and A. M. Lewis, article, Annual Report of the Fishing Industry Research Institute, 1955-1956, vol. 9, pp. 27-28, printed. Fishing Industry Research Institute, Cape Town, Union of South Africa.

"Fish Meal. 13--Test Shipment of Fish Meal," by R. J. Nachinius, article, Annual Report of the Fishing Industry Research Institute, 1955-1956, vol. 9, pp. 29-30, printed. Fishing Industry Research Institute, Cape Town, Union of South Africa. Reports on experiments with fish meal shipped in bags under test conditions in two normally ventilated holds of a ship.

"Fish Meal. 17--The Biological Evaluation of South African Fish Meals," by J. S. Willmer, article, Annual Report of the Fishing Industry Research Institute, 1955-1956, pp. 31-32, printed. Fishing Industry Research Institute, Cape Town, Union of South Africa.

"North Dakota Tests Substitution for Fish Meal in Turkey Diet," article, Feedstuffs, vol. 30, January 25, 1958, 1 p., printed. Feedstuffs, Miller Publishing Co., 118 S. 6th St., Minneapolis 2, Minn.

## FLATFISH:

Information on the Effect of the Fishery on the Condition and Composition of the Stock of

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Flatfishes in the Gulf of Peter the Great, by P. A. Moiseev, 12 pp., processed. (Preliminary translation by W. E. Ricker from *Zoologicheskii Zhurnal*, vol. 25, no. 5, pp. 451-457, 1946.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, 1956.

#### FLORIDA:

A List of Florida Fishes and Their Distribution, by John C. Briggs, 98 pp., illus., printed, \$1.29. (Reprinted from *Bulletin of the Florida State Museum, Biological Sciences*, vol. 2, no. 8, 1958.) Curator of Biological Sciences, Florida State Museum, Seagle Bldg., Gainesville, Fla.

Report on the Marine Biological Museum, January 1958, 11 pp., illus., processed. The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Virginia Key, Miami 49, Fla.

#### FLOUNDER:

"Frozen Storage of Plaice for Subsequent Thawing and Filleting," by W. J. Dyer, W. A. MacCallum, and Doris I. Fraser, article, *Progress Reports of the Atlantic Coast Stations No. 66*, September 1957, pp. 9-12, printed. Fisheries Research Board of Canada, Ottawa, Ontario, Canada. Reports on experiments to learn if frozen plaice or sea dab (*Hippoglossoides platessoides*) can be stored for thawing and filleting at a later date. Results indicated that discoloration occurs beneath the skin of the plaice (guttled and unguttled), after a very short time in frozen storage.

#### FOOD AND AGRICULTURE ORGANIZATION:

"Plans for the European Common Market and Their Possible Repercussions on Exporters of Agricultural Commodities," by R. Freire, article, *Monthly Bulletin of Agricultural Economics and Statistics*, vol. VII, no. 4, April 1958, pp. 1-17, printed, single copy 2s. 6d. (50 U. S. cents). Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. (For sale by Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N. Y.) Describes the Treaty which established the European Economic Community, usually referred to as the Common Market, and discusses many of the basic problems of implementing the Common Market. The Common Market comprises six countries: Belgium, France, Western Germany, Italy, Luxembourg, and the Netherlands. This article discusses trade of the six countries, agricultural imports (including fishery products), possible quantitative restrictions to trade in agricultural commodities, availability of agricultural commodities the six also produce themselves, the Common Market and the development of agriculture in the six countries, possible effects of Common Market on imports of commodities also produced by the six, imports from associated Territories and overseas departments, effects of the Common Market on imports which suffer competition from overseas Territories, and other aspects of the association of dependent Territories to the Common Market. Statistical tables show imports of agricultural commodities of the six countries, by origin, 1954-56 average; production and availability of agricultural com-

modities produced in the six countries, average 1954/55-56/57; and agricultural exports of the six countries, annual average 1954-56. These tables include data on fishery products.

2nd World Fishing Boat Congress, 16 pp., April 5-10, 1959, Rome, Prospectus. Food and Agriculture Organization of the United Nations, Rome, Italy. (Available at United Nations Mission to the United Nations, 2 Park Ave., New York 16, N. Y.)

The Food and Agriculture Organization has published reports describing that Agency's activities under the Expanded Technical Assistance Program for developing the fisheries of many countries. These reports have not been published on a sales basis, but have been processed only for limited distribution to governments, libraries, and universities. Food and Agriculture Organization, Viale delle Terme di Caracalla, Rome, Italy.

Report to the Government of Yugoslavia on Fish Consumption and Marketing, based on the work of John Fridthjof, FAO Report No. 619, 39 pp., processed, 1957. Assistance was provided the government of Yugoslavia to conduct a general survey of the marketing and distribution of fishery products and to advise and assist the government on the introduction of measures designed to (1) achieve a more economic utilization of fish supplies, and (2) improve the level and pattern of fish consumption. This report discusses the problems encountered, the general objectives of the study, the work accomplished, governmental measures in support of the work, and recommendations. Statistical data are given on landings of fish in Yugoslavia by Republics and by species; monthly landings and utilization and annual landings of fish in Croatia; costs of catching and distributing fresh sardines; costs for operating a sardine fishing unit; and cost of receiving and distributing fish in Belgrade.

#### FRANCE:

Rapport sur la Production de l'Industrie des Pêches Maritimes et de la Conchyliculture en 1957 (Report on the Production of the Marine Fisheries Industry and Shellfish Cultivation, 1957), 56 pp., processed in French. Comité Central des Pêches Maritimes, Paris, France. Presents statistical tables covering France's production of fresh fish, salted cod, crustaceans, frozen fishery products, shellfish, and shell.

#### GENERAL:

Progress Report on Fisheries Engineering Research Program, November 1956 (North Pacific Division, Corps of Engineers, U. S. Army), 179 pp., illus., processed. North Pacific Division, Corps of Engineers, U. S. Army, Seattle, Wash. The present summary of progress is a brief account of the methods, purpose, and present results of the separate projects which comprise the fishery engineering research program begun in 1951. This interim summary is a compilation of the following individual reports, each prepared by the agency performing the study: "A Review of Studies in Guiding Downstream



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Migrating Salmon with Light;" "Determination of the Normal Stream Distribution, Size, Time, and Current Preference of Downstream Migrating Salmon and Steelhead Trout in the Columbia and Snake Rivers;" "The Effect of Sound Waves on Young Salmon;" "Powerhouse Collection System and Transportation Flows, Bonneville Dam;" "The Status of Field Scale Electrical Fish Guiding Experiments;" "Effect of Structures at Main Columbia River Dams on Downstream Migration of Fingerlings;" "Buoyant Submerged Orifice Research;" "Study of the Effect of Magnetic Fields on Salmon;" "Fishway Attraction Water Supply Study;" "Submerged Orifice Research Powerhouse Fish Collection System, Bonneville Dam;" "The Control of Downstream Migrants by Means of Mechanical Screens;" "Research Relating to Mortality of Downstream Migrating Salmon Passing McNary Dam;" "Research Relating to Study of Spawning Grounds in Natural Areas;" "Investigation of the Rate of Passage of Salmon and Steelhead Trout through Bonneville Dam and The Dalles Dam Site as Compared to Unobstructed Sections of the Columbia River;" "Investigations and Field Studies Relating to Numbers and Seasonal Occurrence of Migratory Fish Entering the Columbia River above Bonneville and the Snake River and Their Final Distribution among Principal Tributaries Thereto;" "Enumeration Study--Upper Columbia and Snake Rivers;" "Research on Fishway Problems;" "A Study to Investigate the Effects of Fatigue and Current Velocities on Adult Salmon and Steelhead Trout;" "A Study to Determine the Effects of Electricity on Salmon and Steelhead Trout;" "Determination of the Vertical and Horizontal Distribution of Seaward Migrants, Baker Dam;" and "Guiding Downstream Migrant Salmon and Steelhead Trout"--A Research Summary."

#### GERMAN FEDERAL REPUBLIC:

Sea-Fish Marketing in the Federal Republic of Germany, by Klaus-Hinrich Krohn and Arnold Allwell, FAO Fisheries Study No. 6, 152 pp., illus., printed, \$1.50 (For sale by Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N. Y.) Food and Agriculture Organization of the United Nations, Rome, Italy, 1957. This study surveys the supply and marketing conditions of the fish industry in the Federal Republic of Germany, and considers in particular the promotion and expansion of marketing. The first chapter on the sea fishery of the Federal Republic of Germany covers an outline of historical development in the coastal and small deep-sea fishery, large herring fishery, and trawler fishery; the importance of the German sea-fish industry; aims of fishery policy; main sources of supply; pattern of landings; and products of the fish industry. Other chapters cover technical facilities and maintenance of quality of fish from catch to marketing; demand for fish; fish marketing; promotion of fish marketing; and a summary of the report which describes the structure and the present economic situation of the fish industry in the Federal Republic.

#### HERRING:

La Campagne Harenguiere, 1956-57 (24 juillet 1956 - 19 janvier 1957), (The Herring Campaign, 1956-57--July 24, 1956 - January 19, 1957), by

Charles Gilis, 30 pp., printed in French and Dutch. Institut d'Etudes Maritimes, Rue du Midi, 16, Ostende, Belgium, 1957. Presents statistics on Belgium's herring fishery in the North Sea. Also reports on biological studies of herring banks and populations in the North Sea and the English Channel.

The East Anglian Herring Season, 1957, 5 pp., illus., processed. Ministry of Agriculture, Fisheries and Food, Fisheries Laboratory, Lowestoft, England, 1958.

An Ecological Survey of the Drift-Net Herring Fishery off the North-East Coast of Scotland. Part II--The Planktonic Environment of the Herring, by R. S. Glover, 53 pp., illus., printed, 13s. (about US\$1.85). (Reprinted from Bulletins of Marine Ecology, vol. V, no. 39, pp. 1-43, Plates I-VIII, December 1957.) The Scottish Marine Biological Association, Oceanographic Laboratory, Edinburgh, Scotland.

The Status of the Major Herring Stocks in British Columbia in 1956-57, by F. H. C. Taylor, A. S. Hourston, and D. N. Outram, FRB. No. 500, 33 pp., illus., printed. (Reprinted from the Report of the British Columbia Department of Fisheries, 1956, pp. 45-77.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, 1957. This report is the tenth of a series of annual reports on the results of herring research carried out at the Biological Station, Nanaimo, B. C., by the Fisheries Research Board of Canada. Continuing the policy of the past three years, the degree of integrity, present status, and level of abundance of each of the major British Columbia herring stocks in 1956-57 are discussed.

#### INDIANA:

A History of the Study of Fishes in Indiana, by Shelby D. Gerking, Contribution No. 505, 11 pp., printed. (Reprinted from Indiana Academy of Science, vol. 66, 1957.) Department of Zoology, Indiana University, Bloomington, Indiana.

#### INTERNATIONAL LAW COMMISSION:

Report of the International Law Commission Covering the Work of its 9th Session, April 23-June 28, 1957, A/3623 (GAOR, 12th sess., suppl. no. 9), 15 pp., printed, 20 U. S. cents. United Nations, New York, N. Y., August 1957. (For sale by the International Documents Service, Columbia University Press, 2960 Broadway, New York 27, N. Y.)

#### IRRADIATION:

Preliminary Design Study of a Food Irradiation Reactor--Phase 2 (AECU-3320), 98 pp., printed, \$2.50. U. S. Department of Commerce, Washington 25, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Preliminary design study of the reactor type selected for use in government process.

#### JAPAN:

Bulletin of the Faculty of Fisheries, Hokkaido University, vol. 8, no. 4, 102 pp., illus., printed in Japanese and English. Faculty of

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Fisheries, Hokkaido University, Hakodate, Japan, February 1958. Contains, among others, the following articles: "Report from the Oshoro Maru on Oceanographic and Biological Investigations in the Bering Sea and Northern North Pacific in the Summer of 1955--IV. Diatom Standing Crops and the Major Constituents of the Populations as Observed by Net Sampling," by Kohei Karohji; "Studies in the Bacteriological Chemistry of Shark Muscle--IV. On the Effects of Temperature upon the Urea Decomposing Ability of the Urea-Splitting Bacteria Isolated from Spoiling Shark Muscle," by Takahisa Kimura; "A Note on the Age and Race of the Red Salmon in the North Pacific Ocean," by Tatsuro Kubo; and "Chemical Studies on Herring Meat," by Shigeo Sasa.

Bulletin of Tokai Regional Fisheries Research Laboratory, No. 17, 98 pp., illus., printed in Japanese with summaries in English. Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-Ku, Tokyo, Japan. Includes, among others, the following papers: "An Index to Relative Size of Fish Population and Effective Fishing Effort," by S. Tanaka; "Studies of the Anchovy Scale. I--Difference in the Scale Characters from Various Body Areas, with a Consideration on Ecological Significance of the Grooves," by K. Kondo; "Growth of the Japanese Anchovy. IV--Age Determination with the Use of Scales," by S. Hayashi and K. Kondo; "Study on Bait for Tuna Long Line. II--Preservation of Bait Squid," by T. Koyama; and "Hydraulic Resistance of Glass-Ball Floats Enwrapped in Protective Nets," by T. Koyama.

Progress Report of the Cooperative IWASHI Resources Investigations, 1954, 177 pp., illus., printed in Japanese with summary in English. Fisheries Agency, Japan Sea Regional Fisheries Research Laboratory, Niigata, Japan, August 1957.

#### LOBSTERS:

The Lobster Fishery of Massachusetts, by Charles L. Wheeler and John T. Hughes, 31 pp., illus., printed. Department of Natural Resources, Division of Marine Fisheries, 15 Ashburton Place, Boston, Mass. Describes the more interesting and important aspects of the life history of the American lobster, together with the methods of capture and some of the problems associated with the lobster fishery of Massachusetts. The authors explain what is being done to promote the welfare of the lobster fishery.

#### MASSACHUSETTS:

The Ocean Fishery (Massachusetts' Oldest Industry), 27 pp., illus., printed. Department of Natural Resources, Division of Marine Fisheries, 15 Ashburton Place, Boston, Mass. Presents a brief description of the growth and development of the Massachusetts' fishing industry from its beginning in the 17th century. It covers the historical background of the fishing industry, the difficulties encountered by the bank fishermen, and the early whale fishery. Included are descriptions of the industry, otter trawl, purse seine, pound nets, line fishing, gill nets and

harpoons, lobster fishery, bay and sea scallop fishery, quahaug fishery, clam fishery, oyster fishery, and other shellfish. Recent developments and the future of the industry also are discussed.

#### MAURITANIA:

"La Langosta Blanca de Mauritania" (The White Spiny Lobster of Mauritania), by Miguel Massuti Oliver, article, Puntal, vol. V, no. 49, April 1958, pp. 12-15, illus., printed in Spanish. Puntal, Apartado 316, Alicante, Spain. Presents a brief summary on the biology and feeding habits of Mauritania's white lobster (Palinurus mauriticus Gruvel).

#### MARKETING:

Marketing Costs for Food, Miscellaneous Publication No. 708, 15 pp., illus., processed, 15 cents. Agricultural Marketing Service, U. S. Department of Agriculture, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) This leaflet summarizes recent trends in food marketing costs and in the distribution of the consumer's food dollar. Although not directly aimed at the fishing industry, the problems and findings in many cases are applicable to the fishing industry or fishery products.

#### NEMATODES:

"Nematodes in the Fillets of Cod and Other Fishes in Newfoundland and Neighboring Areas," by Wilfred Templeman, H. J. Squires, and A. M. Fleming, article, Journal of the Fisheries Research Board of Canada, vol. 14, November 1957, pp. 831-897, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.

#### NEW HEBRIDES:

A Survey of Fisheries in the New Hebrides With Preliminary Recommendations, by H. vanPel, 33 pp., illus., processed. South Pacific Commission, Noumea, New Caledonia, 1956. Contains a general description of New Hebrides, imports of preserved fish, exports of green snail and trochus shells, existing fisheries and fishery resources, and a brief list of certain species of fish. Also contains observations and recommendations for the development of the fisheries; draft regulation for the trochus fishery; and descriptions of the inland fisheries, tuna industry, fishing gear, and preservation of fish.

#### NORWAY:

Fiskeflaten, 1956 (The Fishery Fleet, 1956), Årsberetning Vedkommende Norges Fiskerier, 1956, No. 13, 37 pp., printed in Norwegian. John Griegs Boktrykkeri, Bergen, Norway, 1957.

#### NUTRITION:

"Nutritive Value of Fish. I--Nicotinic Acid, Riboflavin, Vitamin B<sub>12</sub>, and Amino Acids of Various Salt-Water Species," by A. E. Teeri, M. E. Loughlin, and D. Josselyn, article, Food Research, vol. 22, March-April 1957, pp. 145-150, printed. Food Research, Department of Food Technology, University of California, Davis, Calif.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

"The Nutritive Value of Marine Products. XVI--The Biological Value of Fish-Flesh Proteins," by J. M. R. Beveridge, article, Journal of the Fisheries Research Board of Canada, vol. 7, February 1947. Journal of the Fisheries Research Board of Canada, Queen's Printer and Controller of Stationery, Ottawa, Canada.

#### OCEANOGRAPHY:

Las Investigaciones Maritimas (Marine Investigations), Laboratorio de Biología Marina, Publication no. 1, 15 pp., illus., printed in Spanish. Universidad Católica de Santo Tomas de Villanueva, Apartado No. 6, Marianao, Habana, Cuba, February 1958. Discusses the simple fundamentals of oceanography, and the relationship of oceanography to fishery resources.

#### OCTOPUS:

A First Record of OCTOPUS MACROPUS Risso from the United States with Notes on Its Behavior, Color, Feeding, and Gonads, by Gilbert L. Voss and Craig Phillips, Contribution No. 203, 10 pp., illus., printed. (Reprinted from the Journal of the Florida Academy of Sciences, vol. 20, no. 4, 1957, pp. 223-232.) The Marine Laboratory, University of Miami, Coral Gables, Fla.

#### OYSTERS:

Epidemic Oyster Disease and Rehabilitation Transfers in 1957, by R. R. Logie, General Series Circular No. 31, March 1958, 2 pp., printed in English and French. Fisheries Research Board of Canada, Biological Station, St. Andrews, N. B., Canada. Epidemic oyster disease was discussed in two earlier circulars in this series--Circulars 28 and 29. The present circular is a further report on epidemics and also describes rehabilitation transfers carried out in 1957. It discusses the established epidemics in New Brunswick and Nova Scotia, new epidemics, effect on production, resistance experiments, rehabilitation transfers in 1957 and 1958, and prospects for recovery of the mainland fisheries.

#### PORTION CONTROL:

"Portion Control Seafoods Head for Biggest Year as Users Jump on Profit Bandwagon," article, Quick Frozen Foods, vol. XX, no. 10, May 1958, pp. 83-84, printed. E. W. Williams Publications, Inc., 82 Wall St., New York 5, N. Y. According to this article, "A special survey of institutional frozen seafood processors revealed that institutional seafood packers experienced a 15 percent sales increase in 1957 over 1956, with much of the gain attributed to a broader selling job and snowballing popularity of portion control products with servers and consumers."

#### PORTUGAL:

Gremio dos Armadores de Navios da Pesca do Bacalhau, Relatório e Contas do Exercício de 1957 e Orçamento para 1958 (Cod Fishing Vessel Owner's Guild, Statement of Operations for 1957 and Budget for 1958), 36 pp., printed in Portuguese. A Comissão Revisora de Contas, Lisbon, Portugal.

Gremio dos Armadores da Pesca de Arrasto, Relatório e Contas do Exercício de 1957 e Orçamento para 1958 (Trawler Owners' Guild, Statement of Operations for 1957 and Budget for 1958), 50 pp., printed in Portuguese. A Comissão Revisora de Contas, Lisbon, Portugal.

Gremio dos Armadores da Pesca da Sardinha, Relatório e Contas do Exercício de 1957 e Orçamento para 1958 (Sardine Vessel Owners' Guild, Statement of Operations for 1957 and Budget for 1958), 21 pp., printed in Portuguese. Comissão Revisora de Contas, Lisbon, Portugal.

#### PROTEINS:

"Denaturation of Fish Proteins," by A. F. M. G. Luijpen, article, Nature, vol. 180, December 21, 1957, pp. 1422-1423, printed. Macmillan and Company, Ltd., St. Martins Street, London, WC2, England. Reports on the influence of the freezing-rate on the denaturation of fish held in frozen storage. Describes experiments performed with irradiated samples of fish.

#### QUALITY:

"Trimethylamine Test for Evaluating the Quality of Rosefish Fillets," by H. P. Dussault, article, Progress Reports of the Atlantic Coast Stations, No. 67, November 1957, pp. 23-25, printed. Fisheries Research Board of Canada, Fisheries Technological Station, Grande-Riviere, Quebec, Canada.

#### RADIATION PRESERVATION:

"Radiation Processing of Foods--2. A Commentary on Present Research," by R. S. Hannan and Margaret J. Thornley, article, Food Manufacture, vol. 32, December 1, 1957, pp. 559-562, printed. Leonard Hill, Ltd., Stratford House, 9 Eden Street, London, NW1, England.

#### REFRIGERATION:

Heat Transfer Measurements on Refrigerated-Food Trailers, AMS-250, 13 pp., illus., processed. Marketing Information Division, Agricultural Marketing Service, U. S. Department of Agriculture, Washington 25, D. C. This study is part of a broad program of research to improve the design and performance of transportation equipment used in the movement of agricultural products, as a means of improving and expanding the marketing of farm products. The report states that, "To date there has been no standard method to measure the performance, or efficiency, of a refrigerated-food trailer body. This study is a basic step in the development of a practical method to rate these trailers in order that they may provide the protection that will prevent the deterioration and spoilage of perishable foods in transit to market." This report describes cooperative research work done on ways of measuring heat transfer characteristics of refrigerated trailers. Tests showed wide variations in characteristics of vehicles and performance of their refrigerating units. Findings emphasized need for standard techniques for rating vehicles for transporting frozen foods. Although not directly aimed at the fishing industry, the problems and findings in many cases are applicable to the fishing industry or fishery products.

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## SALMON:

Contributions to the Life-History of the Sockeye Salmon, by D. R. Foskett and D. W. Jenkinson, Paper 42, FRB. No. 501, 20 pp., printed. (Reprinted from the Report of the British Columbia Department of Fisheries, 1956, pp. 25-44.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, 1957.

The Movements of Salmon Tagged in the Sea, Montrose, 1954, 1955, by W. M. Shearer, Scottish Home Department Freshwater and Salmon Fisheries Research No. 20, 13 pp., illus., printed, 4s. (56 U. S. cents). Her Majesty's Stationery Office, Edinburgh, Scotland.

Rapid Learning of a Constant Course by Traveling Schools of Juvenile Pacific Salmon, by William S. Hoar, 24 pp., illus., printed. (Reprinted from the Journal of the Fisheries Research Board of Canada, vol. 15, no. 2, pp. 251-274, 1958.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada.

Research on Guiding Young Salmon at Two British Columbia Field Stations, by J. R. Brett and D. F. Alderdice, Bulletin No. 117, 84 pp., illus., printed, 75 Canadian cents. Queen's Printer, Ottawa, Canada, 1958.

The Salmon of South Sakhalin, by P. A. Dvinin, Translation Series No. 120, 48 pp., processed. (From Izvestia Tikhookeanskovo Nauchno-Issledovatel'skovo Instituta Rybnovo Khoziaistva i Okeanografii, vol. 37, pp. 69-108, 1952, Vladivostok; and translated by the Bureau for Translations, Foreign Language Division, Department of the Secretary of State of Canada, edited by W. E. Ricker.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, 1957.

Some Effects of Temporary Exposure to Low Dissolved Oxygen Levels on Pacific Salmon Eggs, by D. F. Alderdice, W. P. Wickett, and J. R. Brett, 22 pp., illus., printed. (Reprinted from the Journal of the Fisheries Research Board of Canada, vol. 15, no. 2, pp. 229-250, 1958.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada.

## SALMON ROE:

"Pasteurization and Storage Life of Salmon Roe," by I. I. Lapshin, article, Food Manufacture, vol. 32, November 1, 1957, 1 p., printed. Food Manufacture, Leonard Hill, Ltd., Stratford House, 9 Eden St., London N. W. 1, England.

## SARDINES:

"Le Commerce de la Sardine dans le Monde" (World Sardine Commerce), by Geep, article, La Pêche Maritime, vol. 37, no. 963, June 1958, pp. 324-327, illus., printed in French. La Pêche Maritime, 180 Boulevard Hausmann, Paris, France. Gives information on world sardine production and sardine processing in many countries.

The South African Pilchard (SARDINOPS OCELA-LATA)--Preliminary Report on Feeding off the

West Coast, 1953-56, by D. H. Davies, Investigational Report No. 30, 40 pp., illus., printed. (Reprinted from Commerce and Industry, November 1957.) Division of Fisheries, Beach Road, Sea Point, Cape Town, Union of South Africa.

The South African Pilchard (SARDINOPS OCELA-LATA) and Maasbanker (TRACHURUS TRACHURUS)--Young Fish Survey, 1955-56, by D. H. Davies, Investigational Report No. 29, 36 pp., illus., printed. (Reprinted from Commerce and Industry, October 1957.) Division of Fisheries, Beach Road, Sea Point, Cape Town, Union of South Africa.

## SCALLOPS:

The Inshore Scallop Fishery of the Maritime Provinces, by J. S. MacPhail, General Series Circular No. 22, 4 pp., illus., printed. Fisheries Research Board of Canada, Atlantic Biological Station, St. Andrews, N. B., Canada, February 1954. This circular describes the Bay of Fundy giant or sea scallop fishery and the variations in gear and fishing methods. It describes types of scallop gear which fishermen have found to be most satisfactory for the particular area in which they are used. In addition, it discusses fishing operations, shucking procedure, and handling of the meats at sea and ashore.

## SEA LIONS:

The Abundance and Distribution of the Northern Sea Lion (EUMETOPIAS JUBATA) on the Coast of British Columbia, by Gordon C. Pike and Brian E. Maxwell, 13 pp., illus., printed. (Reprinted from the Journal of the Fisheries Research Board of Canada, vol. 15, no. 1, pp. 5-17, 1958.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada.

## SEAWEED:

(Institute of Seaweed Research) Annual Report for 1957, 23 pp., printed. Institute of Seaweed Research, Inveresk, Midlothian, Scotland. This report covers the activities of the Institute during 1957, its information and technical assistance services, and ecological research studies. It also gives a summary of the work carried out under extramural contract and on a collaborative basis during 1957 covering algal chemistry, plant physiology, microbiology, and other applications of seaweed and algal chemicals.

## SHELLFISH:

"Survival and Growth of Clam and Oyster Larvae at Different Salinities," by H. C. Davis, article, The Biological Bulletin, vol. 114, June 1958, pp. 296-307, printed, single copy \$2.50. The Biological Bulletin, Marine Biological Laboratory, Woods Hole, Mass.

## SHELLS:

"American Shell Market is Not Too Bright," by J. P. Shortall, article, Pacific Islands Monthly, vol. XXVIII, no. 10, May 1958, pp. 61, 63, printed. Pacific Publications Pty. Ltd., Technipress House, 29 Alberta St., Sydney, Australia. Discusses the various influences that control



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the future of the Pacific mother-of-pearl and trochus shell market in the United States.

#### SHIPWORMS:

Sea Water Intrusion into the Fraser River and its Relation to the Incidence of Shipworms in Steveston Cannery Basin, by Susumu Tabata and Robin J. LeBrasseur, 23 pp., illus., printed. (Reprinted from Journal of the Fisheries Research Board of Canada, vol. 15, no. 1, pp. 91-113, 1958.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada.

#### SHRIMP:

"Biochemical and Bacteriological Methods for Determining Shrimp Quality," by C. R. Fellers, M. Gagnon, and R. Khatchikian, article, Proceedings of the Gulf and Caribbean Fisheries Institute, Ninth Annual Session, November 1957, pp. 23-26, printed. Gulf and Caribbean Fisheries Institute, 1 Rickenbacker Causeway, Virginia Key, Miami, Fla.

"Controlled Culture of Shrimp Seen on Horizon on a Commercial Scale," article, Frosted Food Field, vol. XXVI, no. 6, June 1958, pp. 3, 9-10, printed. Frosted Food Field, 321 Broadway, New York 7, N. Y. According to this article, "The controlled culture of shrimp on a commercial scale is at present probably only two or three years away." This article describes experimental work being done on cultivating and growing shrimp in sheltered salt-water inlets, bayous, rice paddies, and artificial salt-water ponds. It points out that, "pond culture of shrimp is, in itself, not a new idea. It has for a considerable number of years been practiced commercially in a number of Asian countries, such as India, Java, Sumatra, and the Philippines, as well as in Italy." This article lists the following advantages offered by shrimp farming: (1) Shrimp processors would no longer have to depend on existing shrimp beds, but could obtain shrimp in almost unlimited quantities; (2) The shrimp in the ponds could be grown and harvested independently of weather conditions. Many fishing days are lost at sea due to weather hazards; (3) The use of large trawlers requiring expensive maintenance would be eliminated; (4) If the right amounts of shrimp larvae are stocked and predators are controlled, mortality of the shrimp in the ponds would be low; (5) Since harvesting seasons could be extended over a period of months, the shrimp could be shipped to market at whatever time of year conditions are most favorable; (6) Shrimp could be available for processing without being subjected to a long trip at sea; and (7) Since inland water acreage is available at low cost, presently unutilized land would be converted to profitable operations.

"Effect of Delayed Handling Upon Shrimp Quality During Subsequent Refrigerated Storage," by E. A. Fieger, M. E. Bailey, and A. F. Novak, article, Food Technology, vol. 12, no. 5, June 1958, pp. 297-300, printed, single copies of periodical--domestic US\$1.50, foreign US\$1.75. (Published by the Institute of Food Technologists.) The Garrard Press, 510 North Hickory, Champaign, Ill. Two experiments are described

which were designed to determine the effects of delayed handling upon subsequent ice storage quality of shrimp. Evidence presented stresses the need for rapid processing of freshly-caught shrimp. For superior quality retention during ice storage, shrimp should be removed from trash fish and headed within an hour or as soon as possible after being caught. This treatment should result in removal of sand veins, high in bacteria, and may retard melanosis appreciably during ice storage. Adequate washing after heading should also contribute a beneficial effect on the ice storage life of the product.

#### SPOILAGE:

The Effect of Spoilage and Handling on the Bacterial Flora of Fish, by J. M. Shewan and D. L. Georgala, DSIR Food Investigation Memoir No. 1090, 2 pp., printed. (Symposium of The Nutrition Society on Clean Food, April 20, 1957--Reprinted from the Proceedings of the Nutrition Society, vol. 16, no. 2, 1957, p. 161.) Department of Scientific and Industrial Research, Food Investigation Organization, Torry Research Station, Aberdeen, Scotland.

"2-Thiobarbituric Acid Method for the Measurement of Rancidity in Fishery Products. II--The Quantitative Determination of Malonaldehyde," by Russell O. Sinnhuber and T. C. Yu, article, Food Technology, vol. 12, January 1958, pp. 9-12, printed. Food Technology, The Garrard Press, 510 North Hickory, Champaign, Ill.

#### TERRITORIAL WATERS:

United Nations Conference on the Law of the Sea. United Nations, New York, N. Y. The following processed reports have been issued:

A/CONF.13/5/Add.3. 4 pp., March 3, 1958. Addendum to comments by governments on the articles concerning the law of the sea prepared by the International Law Commission at its 8th session. Preparatory Document No. 5.

A/CONF.13/5/Add.4. ---. 3 pp., March 18, 1958.

A/CONF.13/21/Corr.1. 1 p., English only, February 14, 1958.

A/CONF.13/21/Add.1. 5 pp. Addendum to Reference guide to resolutions and records concerning the law of the sea adopted by world-wide or regional international conferences and meetings. Preparatory Document no. 16. By the Secretariat of the UN.

A/CONF.13/34. Agenda. 1 p. February 26, 1958.

A/CONF.13/35. 19 pp., February 26, 1958. UN Conference on the Law of the Sea. Rules of procedure.

A/CONF.13/36. 5 pp., including annex, February 28, 1958. Memorandum concerning Art. 66 of the articles concerning the law of the sea, adopted by the International Law Commission at its 8th session. Submitted by the World Health Organization.

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#### TIDES:

Tide Tables--East Coast, North and South America (including Greenland), 1959, 271 pp., printed, 50 cents. U. S. Department of Commerce, Coast and Geodetic Survey, Washington 25, D. C. This publication contains tables on daily tide predictions for 44 reference stations and differences for about 1600 stations in North and South America, approximate height of tide at any time, local mean time of sunrise and sunset, reduction of local mean time to standard time, moonrise and moonset for eight places, and astronomical data. Explanatory notes to facilitate usage of each table are included. Also contains a list of Coast and Geodetic Survey publications relating to tides and tidal currents.

#### TRADE AGREEMENTS AND TARIFFS:

Operation of the Trade Agreements Program, 10th Report, July 1956-June 1957, 276 pp., processed, United States Tariff Commission, Washington 25, D. C., 1958. Although the Contracting Parties to the General Agreement on Tariffs and Trade did not sponsor any multilateral tariff negotiations during the period covered by this report, the United States engaged in limited trade-agreement negotiations, under the General Agreement, with Cuba and with the United Kingdom and Belgium. The report describes the negotiations with those countries and analyzes the concessions that the United States granted to and obtained from Cuba, as well as the compensatory concessions that it granted to the United Kingdom and Belgium. This report also covers other important developments that occurred during 1956-57 with respect to the trade agreements program. These include the proposed legislation concerning United States participation in the Organization for Trade Cooperation; the major developments relating to the general provisions and administration of the General Agreement; the actions of the United States relating to its trade agreements program (among the activities under the escape clause is included the third investigation on groundfish fillets); developments with respect to European economic integration, such as the Common Market and the proposed European free-trade area; the relationship to the General Agreement of the various multilateral associations and regional groupings of countries that have grown up since the war; and the changes made in quantitative trade restrictions and exchange controls by countries with which the United States has trade agreements.

#### TRAWLERS:

The Design of the "Sir William Hardy," by G. C. Eddie, DSIR Food Investigation Memoir No. 1087, 6 pp., illus., printed. (Reprinted from The Shipbuilder and Marine Engine Builder, August 1957) Department of Scientific and Industrial Research, Food Investigation, Torry Research Station, Aberdeen, Scotland. The purpose of this article is to set forth the considerations which governed the design and specification of the first British Diesel-electric trawler--the Sir William Hardy, which is equipped for research in the field of fish preservation. The work of the Torry Research Station is outlined

to show the requirements for the new vessel and details concerning the choice of the propulsion system, the winch drive, the constant-current control system, bridge control, the high-speed engines, the engineroom, the trawl winch, and other notable features of the ship.

#### TROUT:

Experiencias Sobre Alimentacion de Truchas en Rio Blanco (Some Findings on the Food of Trout in Rio Blanco), by Antonio Bories Valenzuela and Alberto Schifferli Chaumont, 12 pp., processed in Spanish. Ministerio de Agricultura, Direccion General de Pesca y Caza, Santiago, Chile, April 1957.

#### TUNA:

"La Campagne Thoniere d'Hiver 1957-1958 a Dakar" (The 1957-1958 Winter Tuna Fishery at Dakar), article, La Pêche Maritime, vol. 37, no. 963, June 1958, pp. 346-348, illus., printed in French. La Pêche Maritime, 190 Boulevard Haussman, Paris, France.

"Datos Sobre el Desarrollo de la Pesca del Bonito en Cuba y su Industrializacion" (Information on the Development of the Fishery for Bonito and Its Industrialization in Cuba), by Ignacio Palomera, article, Mar y Pesca, vol. II, no. 2, April 1958, pp. 34-35, illus., printed in Spanish. Instituto Nacional de la Pesca, Malecon 59, Havana, Cuba. A brief review of the fishery for bonito in Cuba, which has increased steadily since 1942. Reports on the bonito canning industry which uses materials manufactured entirely in Cuba.

Geographical Distribution of the Annual Catches of Yellowfin and Skipjack Tuna from the Eastern Tropical Pacific Ocean from Vessel Logbook Records, 1952-1955, by Bell M. Shimada, 77 pp., illus., printed in English and Spanish. (Reprinted from Inter-American Tropical Tuna Commission Bulletin, vol. II, no. 7, pp. 289-363) Inter-American Tropical Tuna Commission, La Jolla, Calif., 1958.

La Pêche Maritime (Marine Fishery), vol. 37, no. 962, May 1958, 63 pp., illus., printed in French. Les Editions Maritimes, 190 Boulevard Haussmann, Paris, France. Contains articles on various aspects of marine fisheries, including the following articles on tuna: "Regards sur l'Evolution de l'Industrie du Thon" (Notes on the Evolution of the Tuna Industry), by L. Plouas; "Le Marche International du Thon et des Conserves de Thon" (International Trade in Tuna and Canned Tuna), by Geep; "Le Probleme du Thon dans la Conserverie" (The Problem of Tuna in the Canning Industry), by A. de Torquat; "Concarneau et le Thon Tropical" (Concarneau and Tropical Tuna); "Resultats de l'Annee 1957 et Perspectives pour la Prochaine Campagne du Thon a Saint-Jean-de-Luz" (Results of the Year 1957 and Prospects for the Next Tuna Season in Saint-Jean-de-Luz), by G. Pommereau; "Dakar, Premier Port Thonier de l'Union Francaise en 1957" (Dakar, the Principal Tuna Port of France), by A. Sahut-Morel; and "L'Utilisation du Froid dans la Pêche au

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Thon" (The Use of Refrigeration in the Tuna Fishery), by Pierre-Henri Lecler.

Proposed Kauai Tuna Cannery, 8 pp., printed. Kauai Engineering Works, Ltd., Kauai, Territory of Hawaii.

A Study of the Dynamics of the Fishery for Yellowfin Tuna in the Eastern Tropical Pacific Ocean, by Milner B. Schaefer, 41 pp., illus., printed in English and Spanish. (Reprinted from Inter-American Tropical Tuna Commission Bulletin, vol. II, no. 6, pp. 247-285.) Inter-American Tropical Tuna Commission, La Jolla, Calif., 1957.

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## SEAFOOD SUGGESTIONS FOR PARTIES

The successful hostess will give careful thought to planning party refreshments, which usually consist of a tasty beverage and hors d'oeuvres and canapes.



VIEW OF TABLE SNACKS.

She should allow about six hors d'oeuvres and canapes for each guest, plus olives, mixed nuts, potato chips, etc. The canapes should be varied in color, flavor, texture, and shape. If possible, she should plan to serve some hot and some cold. They should be the type that most of the preparation can be done ahead of time. The canapes should be arranged artistically on attractive trays.

Fish and shellfish lend themselves very well for interesting and appetizing canapes. A varied assortment to use are clams, crabs, Maine sardines, shrimp, tuna, and frozen prepared fish sticks. They may be obtained fresh, frozen, canned, or in specialty packs.

The home economists of the U. S. Bureau of Commercial Fisheries suggest using the following recipes for your holiday hors d'oeuvres and canapes.

**Drain clams. Save liquor.** Soften cheese at room temperature. Combine all ingredients except potato chips and liquor; blend into a paste. Gradually add about one-quarter cup clam liquor and beat until consistency of whipped cream. Chill. Serve in a bowl surrounded by potato chips. Makes about one pint dip.

- |   |                                 |
|---|---------------------------------|
| 1 CAN (7 OUNCES) MINCED CLAMS           | 1 TEASPOON WORCESTERSHIRE SAUCE |
| 2 PACKAGES (3 OUNCES EACH) CREAM CHEESE | 3 DROPS TABASCO                 |
| $\frac{1}{4}$ TEASPOON SALT             | 2 TEASPOONS CHOPPED PARSLEY     |
| 2 TEASPOONS GRATED ONION                | POTATO CHIPS                    |
|   | 2 TEASPOONS LEMON JUICE         |

### PRECOOKED FISH BITES

One package (8 or 10 ounces) precooked fish sticks. Cut each fish stick in four pieces and place in a single layer in a baking pan. Bake in a hot oven, 400° F., for 15 to 20 minutes or until heated through and crisp. Spear each piece with a colored toothpick and serve with a cocktail sauce. Make 32 to 40 fish bites.

### COCKTAIL SAUCE

- |                               |                                    |
|-------------------------------|------------------------------------|
| $\frac{3}{4}$ CUP CATSUP      | 6 DROPS TABASCO                    |
| $\frac{1}{4}$ CUP LEMON JUICE | 3 TABLESPONS FINELY CHOPPED CELERY |
| $\frac{1}{4}$ TEASPOON SALT   |                                    |

Combine all ingredients and chill. Makes about one cup dip.

### MAINE SARDINE CHEESE BALLS

- |   |  |
|---|--|
| 1 CAN ( $3\frac{1}{2}$ OUNCES) MAINE SARDINES | 1 TEASPOON GRATED ONION                      |
| 2 PACKAGES (3 OUNCES EACH) CREAM CHEESE       | $\frac{1}{4}$ TEASPOON SALT                  |
| 1 TEASPOONS PREPARED MUSTARD                  | DASH CAYENNE PEPPER                          |
| 1 TEASPOON LEMON JUICE                        | $\frac{3}{4}$ CUP FINELY CHOPPED SALTED NUTS |

to small balls. Roll in nuts. Chill. Serve using colored toothpicks. Makes about 60 balls.

Remove any shell or cartilage from crab meat. Combine mayonnaise, seasonings, lemon juice, and crab meat. Remove crusts and toast bread. Spread crab mixture on each slice of toast. Combine Cheese and crumbs, sprinkle over top of each slice of toast. Cut each slice into 6 pieces. Place on a broiler pan about three inches from source of heat. Broil for two to three minutes or until brown. Makes approximately 72 canapes.

### CRAB CANAPES

- |   |  |
|---|--|
| 1 POUND CRAB MEAT                         | DASH PEPPER                              |
| 3 TABLESPONS MAYONNAISE OR SALAD DRESSING | 1 TABLESPOON LEMON JUICE                 |
| 1 TABLESPOON PREPARED MUSTARD             | 12 SLICES WHITE BREAD                    |
| $\frac{1}{4}$ TEASPOON SALT               | $\frac{1}{4}$ CUP GRATED-PARMESAN CHEESE |
|   | 2 TABLESPONS DRY BREAD CRUMBS            |

Drain tuna. Flake. Add celery and mayonnaise; blend into a paste. Combine butter and horseradish. Spread horseradish-butter on crackers. Top with tuna mixture. Garnish with parsley sprinkled over the top. Makes 32 canapes.

### TANGY TUNA CANAPES

- |   |                                       |
|---|---------------------------------------|
| 1 CAN (6 $\frac{1}{2}$ OR 7 OUNCES) TUNA  | $\frac{1}{2}$ CUP BUTTER OR MARGARINE |
| 1 TABLESPOON FINELY CHOPPED CELERY        | 3 TABLESPONS HORSERADISH              |
| 3 TABLESPONS MAYONNAISE OR SALAD DRESSING | 32 ROUND CRACKERS                     |
|   | CHOPPED PARSLEY                       |

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